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ECOSYSTEMS OF THE FLORIDA KEYS

A Bibliography

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ECOSYSTEMS OF THE FLORIDA KEYS

A Bibliography

compiled, edited, and indexed by

Linda Pikula
NOAA Regional Library
Miami, Florida

and

Stanley Elswick
NOAA Central Library
Rockville, Maryland

United States Department of Commerce
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PREFACE

This bibliography was originally prepared for the Florida Keys National Marine Sanctuary located in Key Largo, Florida by the NOAA Regional Library in Miami, Florida. It was prepared with the idea that it would be used by scientists and educators interested in the Keys. The majority of citations are references to works about marine invertebrates and flora, with a substantial number of citations to works about oceanography, geology, meteorology, marine mammals and fishes, and terrestrial flora and fauna.

The bibliography was compiled from searches in the DIALOG online databases conducted in February and March of 1991. Additional citations came from suggestions from individuals who critiqued the first draft. The following list shows the databases searched and the time period coverage of each:

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NTIS (NATIONAL TECHNICAL INFORMATION SERVICE) (1964-)
OCEANIC ABSTRACTS (1964-)
PASCAL (1973-)
POLLUTION ABSTRACTS (1970-)
SCISEARCH (1974-)
SSIE CURRENT RESEARCH (1978-1982)
WATER RESOURCES ABSTRACTS (1968-)

The bibliography was prepared using ProCite and Word Perfect software. The citations were downloaded from Dialog to ProCite where they were put into rough bibliographic form. The final version was edited and indexed using Word Perfect and the 13th edition of the Chicago Manual of Style.

We would like to thank everyone who reviewed the initial draft of this document and provided criticisms and suggestions. In particular we would like to thank Fred Lohrer of the Archbold Biological Station for his suggestions for additions to the bibliography and on the format of the index. We would also like to thank Dr. Elaine Collins of the National Oceanographic Data Center for her numerous suggestions and editing. Thanks also are due to Commander Alan R. Bunn of the Florida Keys National Marine Sanctuary for permission to publish the results of the original searches.

The cover photo is from a poster developed for the Florida Keys National Marine Sanctuary.

This bibliography is available in paper copy as well as a WordPerfect file. To obtain an IBM-compatible electronic copy send a formatted, high-density floppy diskette (either 3.5" or 5.25") along with your request. Requests for copies of the bibliography in any form as well as questions or comments about the materials cited may be addressed to:

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ECOSYSTEMS OF THE FLORIDA KEYS

1. Abbott, R. T. 1976. "*Cittarium pica* Trochidae in Florida USA." Nautilus 90 (1): 24
   Recent reports of living specimens of the West Indian trochid, *C. pica* (Linne), at various localities along the shores of Marathon and Molasses Keys seem to substantiate the fact that this species has become established, at least temporarily, along the Florida Keys [USA]. Whether they were introduced from the West Indies purposefully or accidentally, or whether they arrived as floating larvae will probably never be ascertained.

2. Alam, M., and J. S. Bergmann. 1981. "On the toxicity of the ciguatera producing dinoflagellate *Gambierdiscus toxicus* Adachi and Fukuyo isolated from the Florida Keys." Journal of Environmental Science and Health (Part A) 16 (5):493-500

3. Alevizon, W. S., and J. C. Gorham. 1989. "Effects of artificial reef deployment on nearby resident fishes : Fourth International Conference on Artificial Habitats for Fisheries, Miami, Florida, USA, November 2-6, 1987." Bulletin of Marine Science 44 (2): 646-661

4. Allen, D. M., J. H. Hudson, and T. J. Costello. 1980. "Post larval shrimp *Penaeus* in the Florida USA Keys species size and seasonal abundance." Bulletin of Marine Science 30 (1): 21-33
   Postlarval shrimp of the genus *Penaeus [P. aztecus* and *P. brasiliensis]* were sampled for 32 mo. (Jan. 1966-Aug. 1968) at Whale Harbor Channel in the Florida Keys. Most postlarvae were pink shrimp *P. duorarum;* the majority had 3 dorsal rostral spines and were approximately 7.5 mm total length. *P. duorarum* postlarvae occurred year-round but were generally most abundant from April-Sept. The seasonal high in postlarval abundance was probably related to the annual increase in water temperature on the offshore spawning grounds and to the annual rise in sea level in the Florida Bay area. Seasonal abundances of postlarvae at Whale Harbor Channel were closely related to abundances of early juvenile *P. duorarum* on the Florida Bay nursery grounds. The juveniles are recruits to the offshore Tortugas shrimp fishery located west of Key West, Florida.

5. Anderson, D. G. 1970. "Isolation, localization and biosynthesis of crassin acetate in *Pseudoplexaura porosa* (Houttuyn)." Biological Bulletin 138 (3): 334-343

6. Anderson, R. A. 1974. "3 new USA records, Lycaenidae and Nymphalidae and other unusual captures from the lower Florida Keys." Journal of the Lepidopterists' Society 28

(4): 354-358

7. Anonymous. 1970. "The world's largest single purpose desalting plant." Water Journal 54 (3): 6-7

8. Anonymous. 1974. "Final installment of Florida Keys study." Solid Wastes Management/Refuse Removal Journal 17 (7)

9. Anonymous. 1974. "Two university students conduct in-depth wastes system survey of Florida Keys." Solid Wastes Management/Refuse Removal Journal 17 (6): 26

10. Anonymous. 1975. "Stalking the wet tornado." Surveyor 9 (2): 24-27

11. Anonymous. 1981. "Key West taps the sea." Public Works 112 (4): 66-67
A reverse osmosis plant leased by the Florida Keys Aqueduct Authority supplies Key West with an additional three mgd of drinking water. A pipeline from Florida City on the mainland is the city's primary water supply source. The plant was designed to reduce the total dissolved solids loading from 38,000 mg/liter to less than 500 mg/liter. A permeator is the actual mechanism that removes dissolved solids from the water. Every cylindrical permeator contains a million or more hollow fibers which act as filtering membranes. Dissolved salts and other minerals in the feedwater are continuously flushed out of the permeator as reject water. The permeator has removed at least 98.5% of the dissolved solids. Plastic and stainless steel are used throughout the plant to resist salt water corrosion. Post-treatment of the water includes degasification to remove carbon dioxide and hydrogen sulfide, and the pH is adjusted to 7.5 before the water is stored.

12. Anonymous. 1981. "Largest reverse osmosis plant in the western world online." Journal of the American Water Works Association 73 (5): 32-34
The largest seawater reverse osmosis plant in the Western Hemisphere will be built to serve the Florida Keys, which now depend on an antiquated 18 in. diameter pipeline from the mainland. A new 36 in. pipeline will be constructed by 1984 at the earliest, and the three mgd seawater desalination plant will help meet the resident and tourist water needs until that time. The plant will use permeators to treat seawater with approximately 38,000 milligrams/liter of total dissolved solids. Following pretreatment and treatment by a single pass through the permeators, the water will be potable and contain less than 500 milligrams/liter of total dissolved solids. Each permeator contains a million or more hollow fibers that act as membranes. Water fed into one end of the permeator

circulates under pressure around the bundle of fibers, forcing the freshwater through the walls of the fibers, after which it is collected as product water.

13. Anonymous. 1981. "Super single pass seawater desalter boosts Florida Keys potable supply." World Water (London) 4 (1): 8

14. Anonymous. 1984. "Keeping the Florida Keys supplied with fresh-water." Public Works 115 (9): 124

15. Anonymous. 1986. "Mass stranding of Fraser's dolphin, *Lagenodelphis hosei*, in the western North Atlantic." Marine Mammal Science 2 (1): 73-76
In January 1982 the authors obtained three skulls and one incomplete.

16. Anonymous. 1988. "News in brief : MacArthur Foundation announces new project." Diversity 15:30
A major initiative to protect the United States' remaining tropical forests has been announced by the MacArthur Foundation. The initiative includes more than $7.5 million in grants to 10 organizations working in Hawaii, Puerto Rico, the Florida Keys, and the U.S. Virgin Islands. The funds will be used to acquire land, manage resources, conduct research that is designed to protect and preserve those native areas, and heighten public awareness of the tropical forests situation. Recipients of the grants include the Nature Conservancy of Hawaii, the Bishop Museum in Honolulu, the Sierra Club Legal Defense Fund, the National Audubon Society, Conservation International, Yale University School of Forestry and Environmental Studies, Natural Resources Defense Council, and the Smithsonium Institution. The article contains little additional information.

17. Atkinson, T. H. 1989. "New synonymy, new species, and notes on Scolytidae *Coleoptera* from southeastern USA." Coleopterists' Bulletin 43 (4): 325-337
New synonymies, new species, and notes on Scolytidae from the eastern United states are presented. New synonymies proposed are: *Hylastes tenuis* Eichhoff 1968 (= *H. exilis* Chapuis 1869), *Chramesus chapuisii* LeConte 1876 (= *C. wisteriae* Wood 1974), and *Hylocurus rudis* (LeConte 1876) (= *H. torosus* Wood 1971). *Phloeotribus pseudoscabricollis* from southern Texas. *Hylocurus carinifrons* from Florida, and *Hylocurus floridensis* from Florida are described as new and included in modifications to existing keys. Morphological notes on *Hylocurus binodatus* Wood including a description of the male are included. Significant range extensions for *Carphoborus bicornus* Wood and *Pseudothysanoes phoradendri* Blackman are reported.

18. Atkinson, T. H. 1989. "The species of *Platypus* of Florida (Coleoptera: Platypodidae)." Entomology Circular (Gainesville) 321
A brief description of the biology is given, and a key is provided for the identification of the 4 species of Platypus occurring in Florida, namely *P. flavicornis, P. compositus, P. parallelus* and *P. quadridentatus.* All these species are borers of trunks and large branches of recently killed trees and may cause economic damage to unmilled logs or standing dead timber.

19. Austin, D. F. 1984. "Studies of the Florida USA Convolvulaceae. Vol. 4, Ipomoea." Florida Scientist 47 (2): 81-87

20. Babinchak, J. A., D. J. Jollow, M. S. Voegtline, and T. B. Higerd. 1986. "Toxin production by *Gambierdiscus toxicus* isolated from the Florida Keys : 2. International Conference on Ciguatera." Marine Fisheries Review 48 (4): 53-56
The toxicities of six clonal Gambierdiscus toxicus cultures collected concurrently from Knight Key, Fla., were compared with the toxicity of the Hawaiian G. toxicus strain, T39. LD_{50} values obtained using mouse bioassay demonstrated a hundredfold range in while-cell toxicity. The Hawaiian and two Floridian strains had comparable mouse toxicity (LD_{50} of about 2.5×10^4 cells/kg. Two additional groups of Floridian strains had toxicities of about 2×10^5 and > 1 million cells/kg, respectively. Fractionation of methanol extracts by high-performance liquid chromatography suggests that toxins produced by different clones of G. toxicus) are indistinguishable from each other but are more polar than fish toxin. Isolates of Ostreopsis heptagona, also isolated from Knight Key, had relatively low toxicities ($LD_{50} > 5 \times 10^6$ cells/kg).

21. Bach, C., B. Hazlett, and D. Rittschof. 1976. "Effects of interspecific competition on fitness of the hermit crab *Clibanarius tricolor."* Ecology 57 (3): 579-586
C. tricolor overlaps strongly in shell utilization with the other common species of intertidal hermit crabs found in the Florida Keys [USA]. Laboratory observations indicated *C. tricolor* can dominate *C. antillensis* in shell fights, while *Calcinus tibicen* dominates *C. tricolor.* In micro-areas of sympatry with *C. antillensis, C. tricolor's* shell fit is better and egg production parameters not affected when compared to adjacent areas where only *C. tricolor* occurs. Sympatry with *C. tibicen* results in a poorer shell fit, a smaller shell size for a given size crab, a smaller mean size of crab, and a disruption of the relationship between clutch size and crab size: shell weight ratio. A strong effect of shell species on the probability of ♀ ♀ being ovigerous was noted. The ecological separation which

characterizes these species over most of their ranges was an evolutionary response, in part, to the effects of interspecific shell competition.

22. Barada, B. 1972. "Environmental termites of the Keys." Florida Naturalist 45 (3): 70-74

23. Baranowski, R. M., and J. A. Slater. 1989. "The utilization of grasses as host plants by a species of *Oedancala* (Hemiptera: Lygaeidae) with the description of a new species from Florida and the West Indies." Florida Entomologist 72 (2): 243-251

24. Barbour, D. B., and S. R. Humphrey. 1982. "Status of the silver rice rat *Oryzomys argentatus*." Florida Scientist 45 (2): 112-116
A survey by livetrapping for *O. argentatus* was conducted in the Lower Keys of Florida [USA]. Rice rats are extirpated from the type locality and do not occur on nearby islands. Reference to the recent changes in sea level suggests that the Lower Keys population of rice rats can be no older than 3000 yr. Reasons are given for assigning *O. argentatus* to a subspecific rank. A single extant population is known from Raccoon Key.

25. Barnard, J. L., and J. D. Thomas. 1987. "New species of *Neomegamphopus* from tropical America (Crustacea: Marine Amphipoda)" Proceedings of the Biological Society of Washington 100 (1): 147-163
Neomegamphopus hiatus is described from Venezuela and the Florida Keys [USA], N. pachiatus and N. heardi from Pacific Panama, and N. kalanii from eastern Florida. Neomegamphopus hiatus and N. pachiatus differ from a close congener, N. roosevelti (tropical eastern Pacific), in the much larger coxa 1 of mature males, the less setose gnathopods, and the broader carpus of the first gnathopod bearing a much deeper incision defining the posterior tooth; the carpus is much shorter and stouter in N. hiatus and N. pachiatus than in N. roosevelti. Neomegamphopus heardi differs from the other species in the bifid tooth on the carpus of gnathopod 1 in males. Questions regarding the reclassification of the Isaeidae, Aoridae, and Neomegamphopidae are explored and the three families amalgamated again to their status of 1973 (except Corophiidae which is segregated).

26. Barnard, J. L., and J. D. Thomas. 1989. "Four species of Synopiidae from the Caribbean region (Crustacea: Amphipoda)." Proceedings of the Biological Society of Washington 102 (2): 362-374
Synopia ultramarina is redescribed from the Gulf Stream and the Florida Keys and comments are made on the tangled taxonomy in *Synopia*. *Tiron bellairsi*, originally described from Barbados, is reported from Belize, at the opposite side

of the Caribbean Basin. *Garosyrrhoe bigarra*, a Pacific species, is also reported from Belize, but no clear subspecific differences are detected as yet between Pacific and Atlantic populations.

27. Barnes, J. K. 1990. "First record of genus *Phymatopterella*, new record in the nearctic region and description of *Phymatopterella ovatimacula*, new species, a new humpbacked fly from Florida USA--Diptera Phoridae." Florida Entomologist 73 (4): 644-649
Phymatopterella, a distinctive genus of predominantly Neotropical phorid flies, is recorded for the first time from the Nearctic Region. *P. ovatimacula* n. sp. is described and illustrated from a series of one female and two males collected near Gainesville, Alachua County, Florida. Existing keys are modified to allow recognition of this genus and species.

28. Barr, J. L., and J. D. Thomas. 1989. "Four species of Synopiidae from the Caribbean region, Crustacea Amphipoda." Proceedings of the Biological Society of Washington 102 (2): 362-374
Synopia ultramarina is redescribed from the Gulf Stream and the Florida Keys [USA] and comments are made on the tangled taxonomy in *Synopia*. *Tiron bellairsi*, originally described from Barbados, is reported from Belize, at the opposite side of the Caribbean Basin. Garosyrrhoe bigarra, a Pacific species, is also reported from Belize, but not clear subspecific differences are detected as yet between Pacific and Atlantic populations. [*S. scheeleana* is also described.].

29. Barton, J. S., and A. C. Tarjan. "A taxonomic survey of marine nematodes in coastal waters of the lower Florida USA Keys." 12th Annual Meeting of the Organization of Tropical American Nematologists, Pointe-a-Pitre, Guadeloupe, Aug. 17-21, 1980.

30. Basan, P. B. 1973. "Aspects of sedimentation and development of a carbonate bank in the Barracuda Keys, South Florida." Journal of Sedimentary Petrology 43 (1): 42-53

31. Bauer, J. C. 1980. "Observations on geographical variations in population density of the echinoid *Diadema antillarum* within the western North Atlantic." Bulletin of Marine Science 30 (2): 509-515
Animal density counts and gondal examinations were conducted within populations of Diadema from the following areas: Curacao, Netherlands Antilles; Barbados, West Indies; U.S. Virgin Islands; British Virgin Islands; Puerto Rico; Grand Cayman, British West Indies; Nassau, Bahamas; Florida Keys, and Bermuda. To determine mean population densities, all

sizes of Diadema were counted within successive m^2-quadrats along transects which were randomly chosen and varied in length according to the site involved. Only daytime counts were made because of the mobility of Diadema) at night when exposed to light. The population densities reported are qualitative observations.

32. Beales, F. W. 1966. "Field study of modern carbonate environments." Bulletin of Canadian Petroleum Geology 14 (1): 180-188

33. Beaven, T. R., and F. W. Meyer. 1978. Record of wells in the the Floridan aquifer in Dade and Monroe Counties, Florida. Tallahassee, Fla.: U.S. Dept. of Interior, Geological Survey. Geological Survey Open-File Report, 78-881. The utilization of the Floridan aquifer as a source of potable water has increased. The use of the Floridan aquifer for subsurface storage of freshwater, and as an industrial water supply in Dade and Monroe Counties, is being considered by water management authorities and some industries. Information on locations, depths, casings, and year drilled for 67 wells that penetrate the Floridan aquifer in Dade and Monroe Counties is presented to assist in planning future uses of the Floridan. Chloride concentrations in water from wells ending in the Floridan aquifer in Dade County ranged from 1,200 to 9,000 milligrams per liter. In Monroe County the chloride concentrations ranged from 1,600 to 20,000 milligrams per liter. Water levels were measured in selected wells to determine the altitude of the potentiometric surface. The measurements indicate that the 40-foot potentiometric line extends from southern Dade County to the upper Florida Keys.

34. Bergmann, J. S., and M. Alam. 1981. "On the toxicity of the ciguatera producing dinoflagellate *Gambierdiscus toxicus* isolated from the Florida Keys USA." Journal of Environmental Science and Health. Part A. Environmental Science and Engineering 16 (5): 493-500
The ciguatoxic dinoflagellate, *G. toxicus* was isolated from Islamorada Key, Florida. Analysis of unialgal cultures indicated that the dinoflagellate produced 2 toxins, a chloroform-soluble toxin and a water-soluble toxin. The former toxin was closely related to ciguatoxin on the basis of TLC and clinical effects manifested in mice. The water soluble toxin was closely related to maitotoxin on the basis of TLC and clinical effects.

35. Bert, T. M., and J. M. Stevely. 1989. "Population characteristics of the stone crab, *Menippe mercenaria*, in Florida Bay and the Florida Keys : Symposium on Florida Bay--A Subtropical Lagoon, Everglades National Park and Miami, FL (USA), 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 515

Information on distribution and abundance, habitat use and reproductive patterns of *Menippe mercenaria* in western Florida Bay and the Florida Keys was obtained from quantitative diving surveys. Density of stone crabs was highest on the Gulf of Mexico side of the middle Keys and lowest on the Atlantic Ocean side of the upper Keys. Mean size of males was largest in western Florida Bay and smallest on the Gulf side of the Keys. Mean size of females was smallest on the nearshore Atlantic side and largest in western Florida Bay and offshore on the Atlantic side. Density in the Keys shifted seasonally, being highest on the Atlantic side in spring and on the Gulf side in fall. Stone crabs excavate burrows under emergent hard substrate (rocks, large sponges, coral heads) or in seagrass (*Thalassia testudinum*) beds. Density was highest in mixed rock/ seagrass habitat, where stone crabs occur in greater densities in holes under hard substrate than in seagrass burrows. The population structure of stone crabs suggests territoriality and/or habitat dominance related to reproductive patterns. Seasonal use of den habitat type changes during mating and spawning seasons.

36. Besada, E. G., L. A. Loeblich, and A. R. Loeblich, III. 1982. "Observations on tropical benthic dinoflagellates from ciguatera endemic areas : *Coolia monotis, Gambierdiscus toxicus,* and *Ostreopsis ovata*." Bulletin of Marine Science 32 (3): 723-735
Laboratory cultures of *C. monotis, G. toxicus* and *O. ovata* were initiated from intertidal areas from the Caribbean *Sera and G. toxicus* from the Florida Keys [USA]. This is the 1st report of these 3 spp. from the Caribbean Sea; the overwintering of G. toxicus in the Florida Keys is reported. Photomicrography of thecae stained by the chloral hydrate-hydriodic acid-iodine method, in conjunction with scanning electron microscopy of critical point dried cells of O. ovata reveal the thecal plate tabulation to be: 1 pp, 4′, 6", 6c, 8s, 5′ ", and 2"". Variations in number of thecal plates and the path of a fission line that partitions O. ovata in cytokinesis are also reported. Thecal plate assignments based on interpretations of plate homologies demonstrate gonyaulacoid affinities of these 3 genera and a sufficiently close relationship among them to place them in the family Ostreopsidaceae. Transmission electron micrographs of sectioned cells of each of the 3 spp. reveals a unique feature of the cytoplasm of all 3 spp.: the occurrence of spirally coiled fibrous material enclosed in vesicles. There is an astral aggregation of these vesicles (= pusule) near the sulcal region of these species. The tethered habit of these species is discussed in relation to the spiral bodies.

37. Bessent, E. 1966. "Desalting by multistage flash evaporation." American Water Works Association. Journal 58

(5): 580-590

38. Bieler, R., and M. G. Hadfield. 1990. "Reproductive biology of the sessile gastropod *Vermicularia spirata* Cerithioidea Turritellidae." Journal of Molluscan Studies 56 (2): 205-220
The reproductive and developmental biology of the sessile gastropod *Vermicularia spirata* (Philippi, 1836), collected from the Florida Keys, [USA] was studied from living and preserved material. Individuals of this species attach themselves to a variety of substrata, but were mainly found embedded in the white sponge *Geodia gibberosa*. Pallial reproductive structures of both sexes of *V. spirata* were found greatly to resemble those of *Turritella communis*, a free-living member of the same family. In both species, animals of both sexes have open pallial ducts formed by two wide, recurved laminae. In the female of *V. spirata*, the laminae of the pallial oviduct serve as a capsule gland; a pair of side pockets represent a fertilization pouch (possibly doubling as a copulatory bursa) and a seminal receptacle. The functional significance of the extensive, open, pallial sperm duct is not yet clear. *Vermicularia spirata* is a protandrous hermaphrodite, and small males are free-living; they become attached at about the time they undergo sex reversal. Fertilization is probably brought about by males crawling close to the apertures of the large, sessile females before releasing sperm. Egg capsules are brooded in the females' mantle cavities. Ova of about 300 µm diameter give rise to large (about 600 µm long) swimming-crawling veliger larvae with shells of two and a half whorls. The veligers are capable of metamorphosis at the time of hatching, but siblings from one brood metamorphosed over a two-week period in the laboratory. Juvenile snails grew rapidly by filtering phytoplankton added to their culture water. The life history of *V. spirata* is well adapted to assure fertilization and recruitment in a species otherwise committed to a sessile, filter-feeding existence.

39. Bielsa, L. M., and R. F. Labisky. 1987. "Food habits of blueline tilefish *Caulolatilus microps* and snowy grouper *Epinephelus niveatus* from the lower Florida Keys USA." Northeast Gulf Science 9 (2): 77-88
Dietary analyses of intestinal contents from 96 blueline tilefish *Caulolatilus microps* (mean TL = 528±94 mm SD) and 32 snowy grouper *Epinephelus niveatus* (mean TL = 609±146 mm SD) collected from the shelf environments (123-256 m) in the lower Florida Keys during July 1980 and May-October 1981, revealed that the two predatory species exhibited different feeding strategies. Blueline tilefish preyed principally on benthic invertebrates, and snowy grouper on fish. Copepods, ophiurolds, and gastropods comprised 60% of the numerical, and urochordates 40% of the

volumetric intestinal contents of blueline tilefish. Frequency of occurrence of prey consumed by tilefish exceeded 505 only for two major taxa-Polychaeta and Natantia. Osteichthyes comprised 47% and 52% of the numerical and volumetric consumption of prey, respectively, by snowy grouper, and occurred in 72% of the intestines; cephalopods ranked second in numerical importance (18%), and brachyuran crabs second in volumetric importance (29%). Differences in prey taxa, space niche, and fish anatomy indicated that tilefish and snowy grouper occupy different trophic niches, which reduces interspecific competition.

40. Bierbaum, T. J., and J. A. Zischke. 1979. "Changes in barnacle population structure along an inter tidal community gradient in the Florida Keys USA." Marine Biology (Berlin) 53 (4): 345-352
Population distributions, densities and percentage deaths and individual size variations of the barnacles *Chthamalus stellatus* and *Tetraclita squamosa* and the distribution of the vermetid snail *Spiroglyphus annulatus* were measured to clarify determinants of invertebrate intertidal population and community structure on bridge pilings in the Florida Keys (USA). The species composition of the pilings community and barnacle population densities corresponded to physical gradients dependent on piling distance from the shore. Interspecific competition for space was insignificant in determining C. stellatus presence or absence on pilings. Intraspecific crowding in high-density zones of adult *T. squamosa* was evidenced by a significant decrease in basal diameter as density increases. The peak percentage of dead *C. stellatus* coincided with peak densities. The percentage of dead *T. squamosa* was at a low point at peak densities due to the ability of *T. squamosa* cyprids to settle and survive on adult shells in high-density regions. Feasible perturbation experiments for testing the importance of interspecific competition in determining the densities and vertical distributions of the species are discussed. The results of such experiments can be used to test the assumptions and predictions of the widely applied competition coefficient measure proposed by Levins. Several theoretical deficiencies of Levins' measure are discussed.

41. Biffar, T. A. 1971. "The genus *Callianassa* Crustacea Decapoda Thalassinidea in south Florida with keys to the western Atlantic species." Bulletin of Marine Science 21 (3): 637-715

42. Bingham, B. L. 1990. The ecology of epifaunal communities on prop roots of the red mangrove, *Rhizophora mangle* (mangrove). Tallahassee, Fla.: Florida State University. Invertebrate communities growing epifaunally on prop roots of red mangroves (*Rhizophora mangle*) were studied to

determine what processes produce patterns of distribution and abundance. Root epifauna were compared among channels in a mangrove island in the Indian River, Florida. Except for flow rate, physical factors did not differ among channels and were not responsible for qualitative and quantitative differences in species' abundances. Neither did flow rate per se explain distributional patterns as survival of transplanted adults and early recruits was similar in channels experiencing very different flow. Epifaunal distributions are explained by patterns of larval supply and recruitment. Species with long-lived planktotrophic larvae were distributed evenly throughout the island. Species with short-lived lecithotrophic larvae were distributed heterogeneously with recruitment patterns and adult abundances reflecting locations of source populations and predominate flow patterns. Dynamics of a mangrove root epifaunal community in the Florida Keys were studied for three years. Despite long-lived species, low recruitment rates, and little climatic seasonality, populations of the dominant epifauna showed large temporal fluctuations in abundance. Species commonly disappeared from roots and dominant species changed continually. The stochasticity of this community resulted from seasonal growth, predation, disturbance, and variable recruitment. Comparisons of recruitment on ceramic tiles, wooden dowels, and Rhizophora roots revealed that caution must be used in modeling natural substrata with artificial surfaces. Artificial surfaces were useful, however, in answering ecological questions related to scale. Eight mangrove root sponge species were tested for allelopathic effects on settling larvae. There was little evidence of recruitment inhibition for any species. On the contrary, recruitment of several species was higher in the presence of sponges. Flow effects and patchy larval supply were more important in structuring the communities than were allelopathic effects of resident sponges. Dispersal of swimming and non-swimming larvae of the ascidian *Ecteinascidia turbinata* was compared. Swimming larvae traveled significantly shorter distances than non-swimming larvae. Swimming appeared to prevent advection of the larvae and enables populations to persist in a patchy mangrove habitat.

43. Bingham, F. O. 1972. "1st recorded occurrence of *Littorina tessellata* from the shores of North America." Veliger 15 (2): 158

44. Blanton, F. S., and W. W. Wirth. 1979. "Arthropods of Florida USA and neighboring land areas. Vol. 10, The sand flies *Culicoides* of Florida USA, Diptera Ceratopogonidae." Arthropods of Florida and Neighboring Land Areas 10:1-204 This account of the sand flies, *Culicoides*, of Florida

includes a historical account and discusses their economic importance and disease transmission, along with control measures. In a biological study the following characteristics were emphasized: biting and mating habits, food, oviposition, larval and saltmarsh habitats. Other topics discussed included colonization, methods of collection and study, geography and morphology. In the systematic account keys to species are provided along with diagnostic tables and descriptions of species.

45. Bohnsack, J. A. 1977. "Community structure on walls of marine man made canal systems of the Florida Keys." Florida Scientist 40 (Suppl. 1): 18

46. Bohnsack, J. A. 1976. "The spider crab *Mithrax spinossissimus* : an investigation including commercial aspects." Florida Scientist 39 (4): 259-266
M. spinosissimus in Lower Florida Keys [USA] canals has an average density of 2-4 individuals larger than 6 cm carapace width per 100/m_2 of canal wall; abundance increased with more and larger crevices. Tagged adults had an 18 mo. molt period. Males comprised 25%, were territorial and showed a marked increase in claw size near 8 cm carapace width. Average crab size was estimated, 5-10% were missing claws and 15-20% were missing walking legs. Although loss of a claw seems to have little effect on survival, claw removal and release is not recommended for commercial use. Commercial exploitation does not appear sustainable at this time.

47. Bohnsack, J. A. 1983. "Resiliency of reef fish communities in the Florida Keys following a January 1977 hypothermal fish kill." Environmental Biology of Fishes 9 (1): 41-53

48. Boike, A. H., Jr., C. B. Rathburn, Jr., C. F. Hallmon, and S. G. Cotterman. 1978. "Insecticide susceptibility tests of *Aedes taeniorhynchus* and *Cules nigripalpus* in Florida USA, 1974-1976." Mosquito News 38 (2): 210-217
F1 larvae and adults from wild populations of *A. taeniorhynchus* (Wied.) and *C. nigripalpus* Theob. in Florida [USA] were tested against malathion, naled, and fenthion, and compared to the susceptible laboratory strains. The areas tested were based on previous results and also included new areas for additional susceptibility information. Both larval and adult forms of *A. taeniorhynchus* were found to be resistant to malathion. F1 adults from one of the Florida Keys were 40 times more tolerant to malathion at the LC50 level based on paired tests with the laboratory susceptible strain. No resistance was detected when larvae or adults from some of these resistant areas were tested against naled or fenthion. F1 larvae of *C. nigripalpus* were as susceptible as the laboratory strain when tested against malathion and naled; however, adults from some areas were up to 5X less

susceptible to malathion.

49. Bomber, J. W. 1987. Ecology, genetic variability, and physiology of the ciguatera-causing dinoflagellate *Gambierdiscus toxicus* Adachi & Fukuyo (Florida Keys, Caribbean). Melbourne, Fla.: Florida Institute of Technology. Studies of the ciguatera-causing dinoflagellate, *Gambierdiscus toxicus,* were conducted over a 4 year period. Ecological studies indicate that *G. toxicus* is dispersed via drift algae, e.g. *Sargassum natans*. Cultures of drift cells were toxic, documenting that a semipelagic mode of transfer is possible in the ciguatera food chain. In a substrate specificity study (Bomber, 1985) *G. toxicus* preferred *Heterosiphonia gibbesii* (Rhodophyta) to 13 other algae examined. The growth rate of G. toxicus and the concentration of an aqueous extract of *H. gibbesii* were positively correlated. Additional experiments with the extract indicate that it functions as a chelator. *G. toxicus* dominated the epiphytic community on several macroalgae examined and its ability to do so may be due to bioactive compounds present in the organic matter that *G. toxicus* exudes (up to 2.6 mg l^{-1}). At this concentration the exudate reduced the growth rate of the littoral diatom *Nitzchia longissima* by 60%. The results of this test were repeatable and extract concentration and growth rate were negatively correlated, $r = -0.98$ ($P < 0.01$). In additional laboratory experiments, temperatures above 28°C and below 26°C limited the division rate of *G. toxicus*. Optimum growth occurred at $32^{0}/_{00}$ salinity. Fastest division rates in light quality experiments were achieved under blue violet to blue light (435 nm and 465 nm). Growth under fluorescent light was reduced above 1.4×10^{16} quanta $\cdot$ cm^{-2} $\cdot$ sec^{-1} (about 11% of full sunlight). Cultures grown at 27°C were more toxic than those at 21°C (3,515±500 cells μ^{-1} vs. 16,536±2,400 cells μ^{-1}, s.d.). Cultures were also more toxic under high irradiance than when light limited (1,587±230 cells μ^{-1} vs. 3,515±500 cells μ^{-1}, s.d.). The genetic variability of clones collected from Martinique to Bermuda was assessed via acclimated reproduction rate and toxicity comparisons. These studies indentified at least three races of *G. toxicus,* and indicate that clones from Bermuda probably interbreed with the moderately toxic (>1,000 cells μ^{-1}) populations from Florida and the Bahamas, but the more toxic (<1,000 cells μ^{-1} Caribbean strains are isolated from Floridian and Bahamian strains. These data also help explain why ciguatera is a larger problem in the Caribbean than in Florida.

50. Bomber, J. W., and D. R. Norris. 1984. Seasonality specificity and geographic distribution of benthic toxigenic dinoflagellates in the Florida Keys USA." 48th Annual Meeting of the Florida Academy of Sciences, Boca Raton, Fla., USA, Mar. 29-31, 1984.

51. Bomber, J. W., D. R. Norris, L. E. Mitchell, D. M. Anderson, A. W. White, and D. G. Baden, editors. 1985. "Benthic dinoflagellates associated with ciguatera from the Florida Keys. Vol. 2, Temporal, spatial and substrate heterogeneity of *Prorocentrum lima.*" 3. International Conference on Toxic Dinoflagellates., 1985.
Prorocentrum lima density was assessed for 13 m from macroalgae collected from 1-2 m depth at 5 ^[3ions in the Florida Keys. Presence/absence of *P. lima* was assessed in the Bahamas. *P. lima*, a toxigenic species, occurred perennially at all Florida Key stations, maximum abundance occurred in the cool water season (< 26° C). Density values one year apart suggest, annual cycles in *P. lima* density. Macroalgal surface area (cm^2/g) and ash content (%) appear to be density regulating factors. Analyses of spatial and substrate heterogeneity suggests that the niche specialization may occur in the benthic dinoflagellate community.

52. Bomber, J. W., M. G. Rubio, and D. R. Norris. 1988. "Epiphytism of dinoflagellates associated with the disease ciguatera : substrate specificity and nutrition." Phycologia 28 (3): 360-368
Five dinoflagellate species associated with the disease ciguatera were found in abundance in the Florida Keys on one seagrass and 15 species of macroalgae in the divisions Chlorophyta, Phaeophyta and Rhodophyta. One ciguatera dinoflagellate, *Gambierdiscus toxicus* Adachi & Fukuyo, had maximum mean abundance (2279±200 cells g^{-1} w/w) on Heterosiphonia gibbesii (Harvey) Falkenberg (Rhodophyceae). The abundance of *G. toxicus* was positively correlated ($r = 0.88$, $P < 0.01$) with macroalgal surface area, of which *H. gibbesii* had the highest (225 cm^2 g^{-1}). Growth rates of axenic cultures of *G. toxicus* and the concentration of the complete, aqueous extract of *H. gibbesii* were positively correlated ($r = 0.95$, $P < 0.01$), with a growth rate maximum of 0.58 division day^{-1} at 10% of full sunlight. Growth in media supplemented with separate fractions of the extract indicated that the lipid phase promoted better growth rates than the protein/carbohydrate phase (0.34 division day^{-1} vs 0.26 division day^{-1}, at 6% of full sunlight). The Zn_{2+} concentration of K medium could be increased to a normally toxic level (2.4×10^{-7} M) without adverse effects as long as extract was present, and growth in the lipid fraction was the least affected. Free nitrate, phosphate and ammonia concentrations in the extract were negligible, indicating that the extract probably functions primarily as a chelator.

53. Bomber, J. W., R. R. L. Guillard, and W. G. Nelson. 1988. "Roles of temperature salinity and light in seasonality growth and toxicity of ciguatera-causing *Gambierdiscus toxicus* Adachi et Fukuyo Dinophyceae." Journal of

Experimental Marine Biology and Ecology 115 (1): 53-66
The ciguatera-causing dinoflagellate *Gambierdiscus toxicus* Adachi et Fukuyo reached maximum abundance in the Florida Keys [USA] when the water temperature was ~30° C; populations were over half maximum when temperature lay in the interval 27-30° C. In laboratory unialgal culture experiments, temperatures > 29 and < 26° C limited division rates, although growth was possible from 19.5 to 34° C. Optimum growth occurred at $32^{o}/_{oo}$ salinity, division rates at 25 and $40^{o}/_{oo}$ were only 34 and 57% of maximum, respectively. Fastest division rates in light-quality experiments were achieved under blue-violet to blue light (435 and 465 nm) with gamma slopes (light-limited growth rate increases) of 0.54 and 0.42, respectively. The gamma slope under green light (525 nm) was 0.36. Growth under fluorescent light was reduced > 1.4 x 1016 quanta · cm^{-2} · s^{-1} (~11% of full sunlight. Under optimum combinations of the aforementioned parameters, growth rates > 0.5 division · day^{-1} could be sustained and led to unusually high yields in large scale cultures of up to 360 mg (dry weight) · l^{-1}. Cultures grown at 27° C were more toxic than those at 21° C (3515±500 cells μ^{-1} vs. 16536±2400 cells · μ^{-1}, SD). Cultures were also still capable of producing toxins at inhibiting high irradiance levels.

54. Bonem, R. M. 1975. Comparison of ecology and sedimentation in Pennsylvanian (Morrowan) bioherms of northeastern Oklahoma with modern patch reefs in Jamaica and the Florida Keys. Norman, Okla.: University of Oklahoma.

55. Bosence, D. W. J. 1985. "The morphology and ecology of a mound-building coralline alga (*Neogoniolithon strictum*) from the Florida Keys." Palaeontology 28: 189-206

56. Bosence, D. W. J. 1989. "Surface sublittoral sediments of Florida Bay : Symposium on Florida Bay--A Subtropical Lagoon, Everglades National Park and Miami, FL (USA) 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 434-453
The author reviews previous work on the surface sediments of Florida Bay and presents results of detailed analysis of sediments from the restricted Cross Banks area and the more open marine Buchanan Keys area. Sedimentary structures, textures, seagrass rhizome depths and measurements of changes in bank morphology all indicate windward erosion and leeward deposition of mound sediment. When surface sediment composition and benthic communities are compared regionally within south Florida they show a trend of reducing diversity from the reef tract through to central Florida Bay. Sediment textures vary locally with windward and leeward environments but show few regional trends in their occurrence.

57. Bosence, D. W. J., R. J. Rowlands, and M. L. Quine. 1985.

"Sedimentology and budget of a Recent carbonate mound, Florida Keys." Sedimentology 32 (3): 317-343
The sedimentology of a Recent carbonate mound is investigated to further our understanding of mound building communities, surface and subsurface mound sediments, and the overall sediment budget of mounds. Nine sedimentary facies of the surface of Tavernier Mound, Florida Keys are described. These sediments are composed of Neogoniolithon, Halimeda, Porites, mollusc and foraminiferal grains, and lime mud. Muds rich in aragonite and high magnesian calcite show little mineralogical variation over the mound surface. Geochemical evidence suggests that the mud is mainly formed from breakdown of codiacean algae and Thalassia blade epibionts. Production rates of the facies are established from in situ growth rate experiments and standing-crop surveys. Annual calcium carbonate production is c. 500 g/m^2. The internal structure of the mound, studied from piston cores and sediment probes, indicates that 7 facies can be identified. Five of these can be related to the present-day facies, and occur in the upper part of the mound (gravel-mound stage). The remaining 2 facies occur in the lower part of the mound (mud-mound stage). A sediment budget for the mound is presented which compares production rates from present-day facies with subsurface sediment masses.

58. Bousquet, Y. 1988. "*Dyschirius* of America north of Mexico : descriptions of new species with keys to species groups and species Coleoptera carabidae." Canadian Entomologist 120 (4): 361-388
The genus Dyschirius includes 56 North American species which are arranged in 13 species groups. Keys are provided for the species groups and the species. Four new species are described: *D. sculptus* Bousquet (type locality: Pass-A-Grille Beach, Florida [USA]; *D. ferrugineus* Bousquet (type locality: Goose Island State Park, Texas); *D. larochellei* Bousquet (type locality; 6 mi. S Lake Placid, Florida); and *D. comatus* Bousquet (type locality: Highlands Hammock, Florida). Six species names are placed in synonymy for the first time. They are (with the junior synonym listed first): *D.arizonicus* Van Dyke 1943 = D. interior Fall 1922; *D. duplicatus* Fall 1901 = *D. affinis* Fall 1901; *D. desertus* Fall 1925 = *D. perversus* Fall 1922; *D. subpunctatus* Hatch 1949 = *D. sphaericollis* (Say 1825); *D. basalis* LeConte 1857 and *D. transmarinus* Mannerheim 1853 = *D. integer* LeConte 1851. The adult and larval character states of the genus are listed and comments are provided for each species group.

59. Bovbjerg, R. V. 1984. "Habitat selection in 2 intertidal snails, genus *Nerita*." Bulletin of Marine Science 34 (2): 185-196
Adult *N. versicolor* and *N. tessellata* occupy higher and lower but overlapping zones of the rocky intertidal coast of the

Florida Keys [USA]. Field and laboratory experiments suggest that the zonation is an active habitat selection based on responses to largely physical factors of light, water depth and slope. Both species are nocturnal, photonegative and are crevice dwellers. Both species migrate with the tide but N. versicolor retreats higher above the rising tide. Evidence for competitive exclusion is lacking but the zonation, though blurred at night when both species wander, does achieve some measure of resource partitioning.

60. Bowman, R., and G. T. Bancroft. 1989. "Least bittern nesting on mangrove keys in Florida Bay USA." Florida Field Naturalist 17 (2): 43-46

61. Bowman, R., G. V. N. Powell, J. A. Hovis, N. C. Kline, and T. Wilmers. 1989. "Variations in reproductive success between subpopulations of the osprey (*Pandion haliaetus*) in south Florida : Symposium on Florida Bay--A Subtropical Lagoon, Everglades National Park and Miami, FL (USA); 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 245-250
Reproductive success of ospreys was used to evaluate the habitat quality of Florida Bay. The authors compared subpopulations that breed and forage exclusively in Florida Bay, an ecosystem suspected to have been impacted by human development, with those nesting adjacent to the bay on the mainline keys and foraging in the Atlantic Ocean, a relatively undisturbed habitat. They conclude that access to the ocean plays a significant role in the greater reproductive success of birds nesting on the mainline keys and suggest that Florida Bay ospreys are experiencing decreased reproductive success due to an inadequate food supply. These results support the contention that the osprey is a sensitive biological indicator.

62. Boyer, B. W. 1972. "Grain accretion and related phenomena in unconsolidated surface sediments of the Florida Reef tract." Journal of Sedimentary Petrology 42 (1): 205-210
Accretionary features (grain coatings, intragranular void fillings, internal and external cements) of Florida reef tract calcarenites are morphologically diverse, but are all products of non-skeletal submarine carbonate precipitation and lithification. Such features are most abundant in sands along the platform edge near the outer margin of the reef tract where flushing of sediment by ocean water is most intense and generally become less abundant on the back reef toward the keys. Accretionary features and lithified micritic aggregates (mostly fecal pellets) common in clean sands are rare in muddy calcarenites of the inner back reef. Presumably, even cementation is inhibited in muddy environments, for two possible reasons: (1) the flux of dissolved carbonate to and within impermeable muddy sediments is relatively small, and (2) the muddy sediments are generally poorly aerated and relatively

rich in organic matter; failure of oxidative decomposition of organic films on carbonate particles may prevent welding of groups of particles or the formation of overgrowths on particles. Well-developed superficial voids and clear microcrystalline cements essentially free of entrapped detrital micrite are found only near the platform edge, where water turbidity is low. A systematic change in abundance and type of accretionary phenomena, like that observed on the present Florida Reef tract, may be a useful paleogeographic indicator.

63. Bradbury, M. G. 1980. "A revision of the fish genus *Ogcocephalus* with descriptions of new species from the western Atlantic Ocean, Ogcocephalidae Lophiformes." Proceedings of the California Academy of Sciences 42 (7): 229-285
The New World genus Ogcocephalus comprises 12 spp. Two species are island endemics in the eastern Pacific, *O. darwini* Hubbs in the Galapagos archipelago and *O. porrectus* Garman off Cocos Island, but the remaining 10 are western Atlantic species. Five of the Atlantic species are described as new: *O. pantostictus* and *O. declivirostris* from the northern and western Gulf of Mexico, *O. rostellum* from the Atlantic coast of the southeastern USA, *O. corniger* also from the Atlantic coast of the southeastern USA but ranging into the eastern Gulf of Mexico and *O. pumilus* from the Caribbean and coasts of the Guianas. *O. parvus* Longley and Hildebrand has a wider range than formerly known, from the coast of the southeastern USA and eastern Gulf of Mexico through the Caribbean to the Atlantic coast of South America. *O. vespertilio* (Linnaeus) has a more restricted range than formerly thought, the coast of Brazil from the mouth of the Amazon to the mouth of the Rio de la Plata. *O. notatus* (Cuvier and Valenciennes) also has a southerly distribution in the western Atlantic, the coast of northern South America from Colombia to northern Brazil. The variable species *O. nasutus* (Cuvier and Valenciennes) is to be allopatric with *O. vespertilio* (Linnaeus), which it most resembles; *O. nastus* ranges from the mouth of the Amazon through the Caribbean to the Bahamas and southeastern Florida. *O. cubifrons* (Richardson) ranges from the Bahamas and the coast of the southeastern USA into the eastern Gulf of Mexico to at least Pensacola, Florida [USA] and Campeche Banks. The name *O. radiatus* (Mitchill) is synonymized with *O. cubifrons*. Illustrated keys, photographs, diagnoses and distribution maps are provided.

64. Brand, U., L. Wassenaar, and J. Kanip. 1986. "Variation in shell chemistry of terrestrial gastropods (*Cerion incanum, Cerion uva*, and *Tudora maculata*) from the Florida Keys and Bonaire." Canadian Journal of Zoology 64 (11): 2399-2404

65. Bright, T. J. 1981. "A brief comparison of the reef system

off Key Largo Florida with the Flower Garden Reef System, northwestern Gulf of Mexico." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA Technical Report CZ/SP ; 1.

66. Brodie, J., and J. N. Norris. "Life histories of *Liagora* species Rhodophyta from the Florida Keys USA." Annual Meeting of the Phycological Society of America, College Park, Maryland, USA, June 24-28, 1990.

67. Brookfield, C. M. 1969. "America's 1st park in the sea." In Wondrous world of fishes, editor-in-chief M. B. Grosvenor. Washington, D.C., U.S.A.: National Geographic Society. pp. 144-155.

68. Brooks, I. H. 1975. "The Florida Current at Key West, summer 1972." Journal of Marine Research 33 (1): 83-92

69. Browder, J. A., J. C. Davis, and E. Sullivan. 1981. "Paying-passenger recreational fisheries of the Florida Gulf Coast and Keys." Marine Fisheries Review 43 (8): 12-20

70. Brown, C. H. 1976. "A colony of *Papilio aristodemus* Ponceanus Lepidoptera Papilionidae in the upper Florida Keys USA." Journal of the Georgia Entomological Society 11 (2): 117-118

71. Brown, L. N. 1970. "Unique mammals found in the Florida Keys." Florida Naturalist 43 (4): 146-147

72. Brown, L. N. 1973. "Populations of a new swallowtail butterfly found in the Florida Keys." Florida Naturalist 46 (2): 25

73. Brown, L. N., and R. M. McGuire. 1969. "Status of the red-bellied squirrel *Sciurus aureogaster* in the Florida Keys." American Midland Naturalist 82 (2): 629-630

74. Brown, R. A., editor. 1976. Union City, Oklahoma, tornado of 24 May 1973. Norman, Okla.: United States National Oceanic and Atmospheric Administration, Environmental Research Laboratories. NOAA technical memorandum ERL NSSL, 80. This monograph contains a series of papers representing an in-depth study of the Union City, OK., tornado of May 24, 1973. The data upon which it is based are unique in that, for the first time, a team of meteorologists sought out and photographed the life history of a tornado; for the first time, Doppler radar measurements were made in a storm that produced a major tornado. The meteorological setting of the tornado is set forth in papers examining the general synoptic

situation, the subsynoptic-scale of meteorological features and associated convective activity, and tall tower measurements preceding the tornadic storm. Mesoscale studies of the tornado include papers on Union City storm history; severe storm splitting and left-moving storm structure; observations of the tornadic storm by plan shear indicators; tornadic storm airflow and morphology derived from single Doppler radar measurements; electromagnetic features of the tornadic storm at three megahertz; and directional measurements of very low frequency sferics in the tornadic storm. The tornado itself is examined in papers that 1) compare its life cycle with a Florida Keys waterspout, 2) interpret the surface marks and debris patterns from the tornado, and 3) analyze the airflow characteristics around the tornado and the evolution of the Doppler radar tornadic vortex signature. Appendices include tornadic intercept strategy and morphological observations; hourly surface weather maps and analyzed fields of meteorological variables on May 24, 1973; rawinsonde observations on May 24, 1973; single Doppler radar data acquisition and analysis; vortex value hypothesis of tornadic storm evolution, etc.

75. "Bryant v. Peppe (Title to submerged land remains in state after emergence by avulsion)." 1970. 238 SO 2D 836-839
Plaintiff landowners sued defendant state public land trustees to quiet title to land. The land had been submerged between two keys, but emerged as dry land as a result of avulsion during a hurricane. The state claimed the land as sovereignty land by reason of its originally submerged character. Plaintiffs contended that they held title by virtue of equitable estoppel because the land had been assessed as gulf-front property and plaintiffs had paid taxes thereon for many years. Reversing a judgment for plaintiffs, the court held that equitable estopel was a proper remedy to bolster title already existing. However, estoppel could not be used to divest the state of its title. Submerged land does not lose its soverign character when, by avulsion, it becomes dry land.

76. Bubb, J. N. 1970. "Distribution of dolomite in a tidal flat environment Sugarloaf Key, Florida." Journal of Geology 78 (4): 499-505

77. Bubb, J. N. 1975. "Holocene carbonate sedimentation, Matecumbe Keys Tidal Bank, South Florida." Journal of Sedimentary Petrology 45 (2): 422-439

78. Bullock, R. C. 1985. "The *Stenoplax limaciformis* species complex in the new-world, Mollusca Polyplacophora Ischnochitonidae." Veliger 27 (3): 291-307
The systematic status of species traditionally associated with the *S. limaciformis* species complex of the New World has remained controversial. The group is reviewed and 4

sibling species are recognized on the basis of differences in shell sculpture, radular morphology and esthete pore density: *S. limaciformis* (Sowerby, 1832) from the tropical eastern Pacific, *S. purpurascens* (C. B. Adams, 1845) from the West Indies and northern South America, *S. floridana* (Pilsbry, 1892) from the Florida Keys south to Colombia, and a long-neglected species, *S. producta* (Reeve, 1847), from the Bahama Islands, Cuba, Jamaica, and Hispaniola south to Honduras and Isla de San Andres. Two distinct lineages are recognized within the sibling group: *S. floridana* and *S. producta* from the western Caribbean and the West Indian *S. purpurascens* and the eastern Pacific *S. limaciformis*. The restricted distribution of the Caribbean species within the West Indian Faunal Province, which is assumed to be a result of a very brief free-swimming larval stage, the insular environment of the area, and ocean current patterns, lends support to the theory of paraprovincialism as applied to the Caribbean. *S. floridana* and *S. producta* exhibit a Caloosahatchian distributional pattern, while *S. purpurascens* reflects a Gatunian origin.

79. Burns, J. M. 1985. *Wallengrenia otho and Wallengrenia egeremet* in eastern North America, Lepidoptera Hesperiidae Hesperiinae. Washington, D.C.: Smithsonian Institution. Smithsonian Contributions to Zoology, 423.
Although *Wallengrenia otho* (Smith) and *W. egeremet* (Scudder) were described as different species (in 1797 and 1863), once egeremet was listed as a variety of otho (in 1877), it tended to stay that way. By mid-twentieth century (what with a little evolution in terminology and concepts), egeremet was generally called a subspecies of otho, which meant (by definition) that the two must be allopatric. Because geographic overlap was apparent, American workers variously (1) invoked a considerable blend zone between the subspecies, (2) pronounced subspecies egeremet a form of otho in their area of sympatry, or (3) suffered sympatric subspecies. The English skipperman Evans (in 1955) deferred to American subspecific usage but noted that egeremet might better be viewed as a species. This view, which is correct, gradually prevailed. Supporting evidence accumulated over the past two decades from about 2500 specimens is here marshalled and critically analyzed. The genitalia of *W. otho* and *W. egeremet* differ strongly, in males, in the distal ends of the aedeagus and valvae and, in females, in the ductus bursae. Superficially, otho is more warmly colored but harder looking and more sharply patterned, whereas egeremet is colder but softer and somewhat blurred. Common in the Gulf States (including the Florida Keys [USA]), otho ranges westward to about 99° and northward to (rarely) the Baltimore-Washington area and the vicinity of Chicago; more common to the north, egeremet ranges from the Gulf States (excluding southern Florida) to southern Canada and westward

to about 96°-97°. Though otho is everywhere multivoltine, egeremet is univoltine over much of its range; but both species are bivoltine and essentially synchronic in their main area of sympatry. Winglength reliably reflects adult size; after allowing for sexual dimorphism (females average larger than males) and geographic variation, it is clear that egeremet is a significantly larger species than otho in eastern North America. Due to prolonged and widespread confusion of otho and egeremet, detailed lists of specimens examined are provided.

80. Burpee, R. W., and Lawrence N. Lahiff. 1984. "Area-average rainfall variations on sea breeze days in South Florida." Monthly Weather Review 112 (3): 520-534
Summer convective regimes over South Florida can be broadly classified as either sea breeze or disturbed. Sea breeze circulations develop on one or both coasts on most days, with relatively little high cloudiness during the morning hours. The sea breeze strongly modulates the development of deep convection and produces a sharp midafternoon peak in rainfall. Disturbed days, which are characterized by extensive high cloudiness near sunrise, also have a rainfall maximum during the afternoon. Relationships between rainfall and thermodynamic and kinematic variables on disturbed and sea breeze days have some significant differences. Comparison of rainfall records from the South Florida peninsula with observations from the Florida Keys, where sea breeze circulations are relatively weak, indicates that the sea breeze is responsible for APPROX. 35-40% of South Florida peninsula rainfall during the summer months. Area-averaged rainfall and the time variations of peninsula-scale surface divergence and hourly rainfall on sea breeze days are affected by the value of midtropospheric humidity, and lower tropospheric lapse rate, wind speed, and wind direction measured at 0700 hr EST. Days with relatively high humidity and steep lapse rates typically have deep convective activity that tends to develop sooner and reach its peak earlier than normal. On such days, surface convergence is significantly less than average in the late afternoon and early evening. Physical and dynamical processes that might explain the smaller values of surface convergence in the late afternoon are discussed. The magnitude of the low-level wind speed (1000-800 mb) observed at 0700 hr EST does not greatly affect the timing of peninsula-scale rainfall. Sea breeze days with weaker than average low-level wind speeds have relatively large values of surface convergence and more rainfall during the afternoon. There are two sea breeze regimes for low-level wind speeds <5 m/sec>. When the low-level wind blows parallel to the peninsula, the sea breeze circulation is strong and area rainfall is greater than average. When the wind blows across the peninsula, the sea breeze is absent or weak and rainfall is

below average.

81. Busey, P. 1986. "Morphological identification of St. Augustinegrass *Stenotaphrum secundatum* cultivars." Crop Science 26 (1): 28-32
A vegatively propagated crop such as St. Augustinegrass [*Stenotaphrum secundatum* (Walt.) Kuntze] should consist of distinctive, easily identifiable cultivars. The purpose of this study was to improve identification criteria for this species and measure the frequencies of various St. Augustinegrass cultivars in Florida [USA]. Morphological traits were recorded in 242 unknown Florida St. Augustinegrass lawn and sod samples, which had been transplanted and grown outdoors in containers with 16 known clonal cultivars and taxonomic representatives. Lawn and sod samples conformed mostly to the expected morphological distributions of 'Floratam', 'Bitterblue', and a heterogeneous 'Roselawn'-like complex. The latter clones were distinctive because of their intermediate-sized (4.6 to 4.8 mm) spikelets, relatively long floral regions (measured from the base of the lower-most spikelet to the tip of the inflorescence), and long, narrow internodes. Therefore, they were named the Longicaudatus ("long-stemmed") Race. Clones with short (< 4.5 mm) spikelets were also distinctive and were named the Breviflorus Race, however, this race was virtually absent in Florida. Spikelet length and length of the floral region separated known cultivars in 84 of 91 pairwise comparisons ($P < 0.05$), and these two traits showed no detectable environmental variance between containers and field plots. Inclusion of floral traits in discriminant analysis increased the proportion of unknown clones that could be identified from 49% (with vegetative traits only) to 95%. Keys using vegetative field traits and replicated container measurements were 93% accurate in identification of knowns, and 86 to 96% consistent with discriminant analysis in identification of unknowns.

82. Butcher, W. A., D. C. Steinker, and J. C. Floyd. 1981. "Recent supracrustal carbonate cementation, Florida Keys." Bulletin of the American Association of Petroleum Geologists 65 (5): 908-909

83. Caira, J., and M. Gavarrino. 1990. "*Grillotia similis* (Linton, 1908) comb n (Cestoda, Trypanorhyncha) from nurse sharks in the Florida Keys." Journal of the Helminthological Society of Washington 57 (1): 15-20

84. Cairns, S. D. 1986. A revision of the northwest Atlantic Stylasteridae Coelenterata Hydrozoa. Washington, D.C. : Smithsonian Institution. Smithsonian Contributions to Zoology, 418.
The 42 species of stylasterid corals (Hydrozoa: Athecata:

Stylasteridae) known from the Northwest Atlantic are described and illustrated, and their distributions are mapped. Twenty-one new species are described. The study is based on specimens collected from approximately 330 localities, including the collections of the National Museum of Natural History (USNM), Museum of Comparative Zoology (Harvard), and Rosenstiel School of Marine and Atmospheric Science, University of Miami (UMML) [USA]. Previous literature on the fauna is reviewed. All species are illustrated by scanning electron micrographs, and about half of the species were examined by histological serial section of decalcified specimens. A dichotomous key to the eight western Atlanta genera and tabular keys to the species of *Distichopora, Stylaster, and Crypthelia* are provided. Distributional patterns of the western Atlantic stylasterids and comparisons to the distributional patterns of the ahermatypic Scleractinia are discussed. Few stylasterids have widespread distributions; 93% of the species are endemic to the western Atlantic. Stylaster roseus, the only shallow-water species, has the broadest distribution in the Caribbean. Unlike the deep-water Scleractinia, stylasterids are not present in waters directly adjacent to continental land masses, and thus do not occur in the Gulf of Mexico, off northern continental South America, or off Central America. Stylasterids are usually found in shallower water than ahermatypic *Scleractinia:* their depth range is rarely less than 100 m or more than 1000 m, but most commonly 150-440 m. Both groups, however, are most diverse in the Lesser Antilles and share several distributional patterns, i.e., Antillena, insular Straits of Florida, and continental slopes off the southeastern United States.

85. Cake, E. W., Jr. 1977. "Larval cestode parasites of edible mollusks of the northeastern Gulf of Mexico." Gulf Research Reports 6 (1): 1-8
Ten distinct species of larval cestodes were obtained from 43 edible, or potentially edible, benthic mollusks of the northeastern Gulf of Mexico. Three of the infected mollusks, American oysters, *Crassostrea virginica*, Atlantic bay scallops, *Argopecten irradians concentricus;* and sunray venus clams, *Macrocallista nimbosa*, are important commercial species in the eastern Gulf, and the remainder are often eaten by epicurean shellfishermen or were consumed by prehistoric, aboriginal Indians of the Gulf coast. The cestodes represent 4 orders, 7 families, and 9 recognized genera and include the *trypanorhynchs, Eutetrarhynchus* sp. and *Parachristianella* sp., the *lecanicephalideans, Polypocephalus* sp. and *Tylocephalum* sp., the *tetraphyllideans. Dioecotaenia cancellata, Anthobothrium* sp., *Rhinebothrium* sp., *Acanthobothrium* sp., and *Acanthobothrium* sp., and the *diphyllidean, Echinobothrium* sp. Infected mollusks were widely distributed in coastal

estuarine and marine habitats from the Mississippi Sound to the Florida Keys. Pelecypods apparently serve as primary intermediate hosts and molluscivorous gastropods apparently serve as secondary intermediate or paratenic (transport) hosts for these cestodes which in turn utilize demersal elasmobranch fish as final hosts. None of these cestodes are known to infect humans, and the only potential harm is to the quality and quantity of the edible molluskan tissues.

86. Carballo, J. D., Lynton S. Land, and Donald E. Miser. 1987. "Holocene dolomitization of supratidal sediments by active tidal pumping, Sugarloaf Key, Florida (Dolomitisation holocene de sediments supratidaux par pompage actif par les marees, Sugarloaf Key, Floride)." Journal of Sedimentary Petrology 57(1): 153-165

87. Carey, R. C., Paul S. Markovits, and James B. Kirkwood. 1981. "Proceedings, U.S. Fish and Wildlife Service Workshop on Coastal Ecosystems of the Southeastern United States : a compilation of seminars, discussions, papers and biological summaries presented at Big Pine Key, Florida, held on February 18-22, 1980 : final report."
This compilation of papers, discussions, and summaries is the result of a workshop held at Big Pine Key, Florida, 18-22 February 1980. The 35 contributions were in the following categories: Ecology of coastal marshes; ecology of mangroves; lower keys wildlife refuges; field trip; ecology of seagrasses and coral reefs; ecology of other coastal environments; problems of the possible assistance for resource managers.

88. Carnes, M. "Seiches at Florida Keys." 1977 American Geophysical Union Spring Meeting, Washington, D.C., 30 May 3 Jun 77.

89. Carnes, M. "Tidal & infra-tidal sea level fluctuations at Florida Keys." American Geophysical Union 1978 Fall Meeting, San Francisco, California, 5-9 Dec 77.

90. Carroll, S. P. 1991. Microevolution of fitness traits in the soapberry bug (Hemiptera: Rhopalidae) (Jadera haematoloma). Salt Lake City, Utah: University of Utah.
Mating behavior is a composite trait that integrates many aspects of the life cycle into events key to reproductive success. Accordingly, mating behavior should be the product of intense natural selection. While many fitness traits have been subjected to evolutionary analysis, important mating behaviors are so complex that they have been treated only at a descriptive level. This dissertation describes studies of the male mating behavior of the soapberry bug, Jadera haematoloma. Genetically isolated populations differ in adult sex ratios. Aggregations

in Oklahoma USA average almost three males per female, while those in the Florida Keys USA have no sex ratio bias. Sex ratios are also more variable in Oklahoma. This situation offers an opportunity to test predictions about the tactical allocation decisions of males.
Interpopulation divergence in other host-adapted traits is considered in the final chapter. Chapter 1 describes the adaptive significance of mate guarding in the soapberry bug in Oklahoma. Prolonged copulation is interpreted as an adaptive form of mate guarding because of the rarity with which single females are encountered and because sperm competition is severe. Chapter 2 tests predictions about tactical allocation differences between the Oklahoma and Florida populations. Single females are encountered much more frequently in Florida. A model predicts that guarding should be more successful in Oklahoma, while searching will outcompete most forms of guarding in Florida. Field studies show that Oklahoma males guard females more frequently than do Florida males, consistent with the prediction. Chapter 3 tests the hypotheses that males in the two populations may be (1) genetically different, or (2) genetically identical, but behaviorally flexible. Captive bugs were studied at a series of sex ratios. Male behavior differed between the populations, and only Oklahoma males altered their allocation behavior in response to changes in sex ratio. Chapter 4 documents the recent colonization of introduced host plants by the soapberry bug, and the resulting response of bug populations to selection for either longer or shorter beak length in relation to host fruit size. Historical patterns of changes in beak length measured from specimens in museum collections are consistent with the patterns of differentiation among the contemporary populations in nature.

91. Carter, P. W., and R. M. Mitterer. 1978. "Amino-acid composition of organic matter associated with carbonate and noncarbonate sediments." Geochimica et Cosmochimica Acta 42 (8): 1231-1238
Amino acids comprise from 15-36% by weight of humic substances from carbonate and non-carbonate sediments. Humic and fulvic acids extracted from carbonate sediments were characterized by an amino acid composition consisting primarily of the acidic amino acids, aspartic and glutamic acid. Humic substances from non-carbonate sediments have a distinctly different amino acid composition consisting primarily of glycine and alanine. Amino acid analyses of various MW fractions of fulvic acids extracted from carbonates show that lower MW fractions have appreciably higher relative abundances of the acidic amino acids compared to higher MW fractions. Based on typical values for carboxyl group content in humic substances, acidic amino

acids may be a significant contributor of these functional groups. Carbonate surfaces appear to selectively adsorb aspartic acid-enriched organic matter; non-carbonates do not have this property. [Samples were collected from the Florida (USA) Keys and Bay region.].

92. Case, R. A. 1988. "Atlantic hurricanes: a subdued season." Weatherwise 41 (1): 25-29
The 1987 Atlantic hurricane season was an uneventful one for the U.S. mainland and had fewer named tropical cyclones than normal. On the average, two hurricanes per season cross the U.S. coastline. In 1987, only a weakening hurricane ("Floyd"), which had passed over the Florida Keys earlier in the season as an unnamed tropical storm, moved across the upper Texas coast. A map showing the tracks of the four tropical storms and the three hurricanes of the 1987 season is presented. The circulations, the tracks and pressure, and the disintegration of the unnamed storm, Hurricane "Arlene," Tropical Storm "Cindy," Tropical Storm "Dennis," Hurricane "Emily," Hurricane "Floyd," and Tropical Depression 14 are discussed.

93. Chan, E. I. 1976. Oil pollution and tropical littoral communities : biological effects of the 1975 Florida Keys oil spill. Coral Gables, Fla.: University of Miami.

94. Cheney, D. P. 1974. "Ecological studies of Floridian Eucheuma (Rhodophyta, Gigartinales). I, Seasonal growth and reproduction." Bulletin of Marine Science 24 (2): 235-273

95. Chew, F., J. M. Bane, Jr., and D. A. Brooks. 1985. "On vertical motion, divergence, and the thermal wind balance in cold-dome meanders: a diagnostic study." Journal of Geophysical Research 90 (C2): 3173-3183
Wavelike meanders are observed along the length of the Florida Current from the Florida Keys to Cape Hatteras. These propagating meanders are three-dimensional; each has a cold dome; and the meandering flow that overtakes the dome in a cyclonic turn is characteristically stronger when flowing offshore than when flowing onshore. The authors focus on vertical motion as a key to understanding the interdependence of the downstream propagation, the upwelling in the cold dome, and the skewness in the strength of the meandering flow.

96. Chung, G. S., and Robert N. Ginsburg. 1985. "Siliciclastic incursion in southern Florida and development of Florida reefs during late Cenozoic Expansion (Des roches siliceuses dans le Sud de la Floride et developpement des recifs de Floride pendant le Cenozoique) : AAPG Annual Convention with division SEPM/EMD/DPA." AAPG Bulletin 69:244

97. Church, C. R., C. M. Ehresman, and J. H. Golden. 1973. "Instrumentation for probing waterspouts." In: Conference on Severe Local Storms, 8th, Denver, CO., Oct. 15-17, 1973, Preprints. Boston, Mass.: American Meteorological Society.

98. Clarke, H. D., D. S. Seigler, and J. E. Ebinger. 1989. "*Acacia farnesiana* (Fabaceae: Mimosoideae) and related species from Mexico, the southwestern U.S., and the Caribbean." Systematic Botany 14 (4): 549-564

99. Coffroth, M. A. 1990. "Mucous sheet formation on poritid corals : an evaluation of coral mucus as a nutrient source on reefs." Marine Biology (Berlin) 105 (1): 39-50
The production, release, and subsequent consumption of coral mucus on reefs has been portrayed as a potential pathway for the transfer of coral and zooxanthellae production to other reef organisms. However, reported muscus production rates and analyses of nutritional value vary widely. Poritid corals provide a test system to measure mucus production because they produce mucous sheets which can be collected quantitatively. Fluid mucus and mucous sheets were collected from *Porites astreoides, P. furcata, P. divaricata* during 1986 and 1987 on reefs in the San Blas Islands, Panama, La Parguera, Puerto Rico [West Indies] and the Florida Keys. Mucus samples were collected from Indo-pacific poritids (*P. australiensis, P. lutea, P. lobata,* and *P. murrayensis*) on the Great Barrier [Australia] during 1985. Biochemical analyses of the fluid mucous secretions, and the derivative mucous sheet, indicate that the mucus is primarily a carbohydrate-protein complex. Porites fluid mucus had a mean caloric content of 4.7 cal mg-1 ash-free dry weight (AFDW), while mucous sheets contained 3.5 cal mg-1 AFDW. Sixty-eight percent of the mucous sheet was ash, while fluid mucus was 22% ash. The high ash and low organic contents suggest that mucous sheets have a low nutritional value. C:N ratios varied (range 6.9 to 13.7 for fluid mucus, and 4.8 to 5.9 for mucous sheets), but were similar to typical C:N ratios for marine organisms. Bacterial numbers and chlorophyll a concentrations were higher on mucous sheets than in the surrounding water. Although bacteria aggregate on mucous sheets, bacteria accounted for less than 0.1% of the carbon and nitrogen content of the mucous sheet. Lower C:N ratios in aged mucus, i.e. mucous sheets versus fluid mucus, were attributed to a loss of carbon rather than an increase in nitrogen. Mucous sheet production accounts for a small proportion (< 2% gross photosynthesis) of published values for coral production. In the San Blas Islands, Panama, *P. astreoides* produced mucous sheets at a rate of 1.5 g $C/m^2/y$ and 0.3 g $N/m^2/y$. *P. astreoides* and *P. furcata* produced mucous sheets with a lunar periodicity and may provide approximately monthly pulses of carbon and nitrogen to the reef food-web. However, the low annual production rates

suggest that mucous sheets make a small contribution to overall energy flow on coral reefs.

100. Cole, B. J. 1983. "Assembly of mangrove ant communities : patterns of geographical distribution." Journal of Animal Ecology 52 (2): 339-348
The mechanisms by which communities of mangrove ants develop are examined. Eight-one small mangrove islands in the Florida Keys [USA] were surveyed for ant species. Islands varied 4 orders of magnitude in size. Each of the 5 major species [*Crematogaster ashmeadi, Xenomyrmex floridanus, Pseudomyrmex elongatus, Zacryptocerus varians* and *Camponotus* sp.] was found only on islands of a certain minimum size (MSR) or larger. For 2 spp., termed primary species, experimental introductions showed that the MSR was due to island unsuitability. For 2 other species, termed secondary species, the MSR was the result of competitive interactions with the primary species. Experiments involving the 2 primary species showed that either was capable of preventing the invasion of the other species. Simultaneous introduction experiments showed that 1 sp. invariably invaded while the other invariably became extinct. Behavioral interactions between all pairs of the species were tested in arena experiments. The patterns of aggression and avoidance were consistent with, and presumed to be the cause of, the experimental results and patterns of geographical distribution.

101. Coles, S. L. 1969. "Quantitative estimates of feeding and respiration for three scleractinian corals." Limnology and Oceanography 14 (6): 949-953

102. Collins, M. R. 1984. Ectoparasites of striped mullet (*Mugil cephalus* L.) in brackish and freshwater habitats (salinity, nematode, copepods). Gainesville, Fla.: University of Florida.
Mugil cephalus (striped mullet) from freshwater (Crystal River) and brackish (Seahorse Key) sites in Florida were examined for gill and body surface parasites. The parasite fauna of the freshwater mullet consisted almost entirely of the copepod *Ergasilus versicolor* and the leech *Myzobdella lugubris*. About 32% of *E. versicolor* were located at the distal tips of the gill filaments, and both prevalence and intensity were negatively correlated with fish length. The remainder were located proximally between hemibranchs, apparently the first time use of this attachment site has been reported, and intensity was positively correlated with fish length. Intensity of *M. lugubris* was negatively correlated with fish length. The fauna of brackish water mullet was more diverse. The copepods *E. versicolor, E. lizae, Bomolochus nitidus,* and *Naobranchia lizae;* adult and immature *Argulus* spp.; and the monogenetic trematode *Metamicrocotyla macracantha* were

commonly encountered. The leech *Malmiana philotherma* (?) was found irregularly in the nostrils of mullet, and several additional species of copepods were rarely collected. *Ergasilus versicolor* were found at the distal tips of gill filaments, not between hemibranchs. Intensity of *E. versicolor* was positively correlated and intensity of *E. lizae* was negatively correlated with host length. Subsamples of mullet from both study sites were examined for nematodes (Contracaecum sp ?). Prevalence and intensity were significantly greater at the backish site, although definitive hosts (piscivorous birds) were common at both locations. Intensity was positively correlated with host length at the brackish but not the freshwater location. Experimental translocations of mullet demonstrated that *E. versicolor* does not move from filament tips to the proximal area between hemibranchs or vice versa as the salinity changes. At each study site, *E. versicolor* apparently attaches at the location typical of that site/salinity and remains there through salinity changes. Differences between parasite species in response to salinity change were noted. Differences in sex ratios and length distributions in addition to several lines of parasitological evidence suggest that in Crystal River a group of large mullet, primarily females, may reside semipermanently. There seems to be little intermingling of even smaller mullet between brackish and freshwater areas except during the spawning season.

103. Collins, M. R. 1984. "Hatschekia oblonga Copepoda Caligoida from yellowtail snapper *Ocyurus chrysurus* in the Florida Keys USA." Journal of Wildlife Diseases 20 (1): 63-64

104. Colton, D. E., and W. S. Alevizon. "A description of the fish assemblage associated with a calcium carbonate reef off the Florida Keys USA." Florida Scientist 42 (Suppl. 1): 22

105. Cooper, W. J., E. S. Saltzman, and R. G. Zika. 1987. "The contribution of rainwater to variability in surface ocean hydrogen peroxide." Journal of Geophysical Research 92 (C3):2970-2980
Hydrogen peroxide concentrations have been determined in marine rain from the Gulf of Mexico ($114-820*10^{-7}$ mol L^{-1}, $x=402*10^{-7}$ mol L^{-1}, $s=218*10^{-7}$ mol L^{-1}), the Western Atlantic Ocean ($84-206*10^{-7}$ mol L^{-1}, $x=127*10^{-7}$ mol L^{-1}, $s=45*10^{-7}$ mol L^{-1}), and one rain event off the Florida Keys ($x=284*10^{-7}$ mol L^{-1}, $s=38*10^{-7}$ mol L^{-1}). In several cases, simultaneous measurements of the concentration of H_2O_2 in the surface ocean were also determined. These measurements were made with the ship underway using a continuous flow sampling system with the intake at the bow. In shallow stratified layers, rain events can increase the existing hydrogen peroxide concentration by a factor greater than 10 and dramatically increase the mean H_2O_2

concentration of mixed depth layers of 50 m or more. Rain is a significant transient source of H_2O_2 in the surface ocean.

106. Cortes, E., and S. H. Gruber. 1990. "Diet, feeding habits, and estimates of daily ration of young lemon sharks, *Negaprion brevirostris* Poey." Copeia 1:204-218
The diet of a tropical elasmobranch, the lemon shark, *Negaprion brevirostris*, was investigated through analyses of stomach contents collected during two sampling periods. Data set 1 consisted of the stomach contents of 78 young and sub-adult specimens caught in the Florida Keys [Florida, USA] and at Bimini, Bahamas, [West Indies], from 1981-85. Data set 2 (n = 86) consisted of newborn and young specimens only, captured in the Florida Keys during the summer of 1986. In the two data sets teleosts were the dominant prey, followed by crustaceans and mollusks. Stomach contents from data set 2 were used to study food consumption parameters and estimate daily ratio. About a quarter fo the stomachs in each data set were empty. No pattern in diel feeding activity or differences in the amount of food consumed by males or females wre found. Feeding in the population was asynchronous and intermittent, with a maximum duration in 11 h. Five methods were applied to determine daily ration. Three of these methods were based upon collection of data on stomach contents of sharks caught in the wild. The other two were laboratory-based approaches. Estimates of daily ration ranged from 1.5-2.1% of the shark's body weight.

107. Cotter, T. "The historical and current status and distribution of the Florida banded tree snail Liguus fasciatus in southern Florida and the Keys USA." 14th Annual Meeting of the Xerces Society, Gainesville, Florida, USA, June 9-14, 1987.

108. Crile, G. J. 1969. Above and below: a journey through our national underwater parks. San Francisco, Calif.: McGraw-Hill Book Company.

109. Croley, F. C., and Clinton J. Dawes. 1970. "Ecology of the algae of a Florida Key. I, A preliminary checklist, zonation, and seasonality." Bulletin of Marine Science 20 (1): 165-185
A 2-1/2 year study of the Content Keys, Florida, has added 14 species to the list of marine algae known in Florida. Environmental and floristic data are presented in a descriptive account of the zonation, seasonality, and periodicity of the littoral and sublittoral algae. The preliminary checklist comprises 258 taxa: 79 Chlorophyta, 29 Phaeophyta, and 150 Rhodophyta. The sublittoral flora are predominately perennial. The algae inhibiting the upper sublittoral are largely Lithophytes. The majority of the lower sublittoral forms are sand-dwelling siphonous green

algae. The measurement of environmental factors included salinity, temperatures, pH, and water transparency.

110. Cross, J. A. 1978. "Residential adjustments to hurricane hazard in Lower Florida Keys." Association of American Geographers 74th Annual Meeting, New Orleans, Louisiana, 9-12 Apr 78.

111. Cross, J. A. 1980. Residents' concerns about the hurricane hazard within the Lower Florida Keys : National Conference on Hurricanes and Coastal Storms. Tallahassee, Fla.: Florida State University System. Sea Grant Program.

112. Cruver, J. E. 1976. "Reverse osmosis : the energy answer to seawater desalination." Industrial Water Engineering 13 (3): 8-11

113. Custer, T. W., I. C. T. Nisbet, and A. J. Krynitsky. 1983. "Organochlorine residues and shell characteristics of roseate tern eggs, 1981." Journal of Field Ornithology 54 (4):394-400
Roseate Terns (*Sterna dougallii*) breed in two areas in the Western Hemisphere: in northeastern North America between Long Island, New York, and Nova Scotia, and around the Caribbean Sea from the Florida Keys and the Bahamas to the Netherlands Lesser Antilles. The present paper reports the results of a survey of organochlorine residues in Roseate Terns in 1981. The main objectives of the survey were to determine the levels of organochlorine contamination in eggs of the Roseate Tern in its major colonies and to investigate whether changes in eggshell characteristics similar to those reported by Fox (1976) may have occurred in this species. A secondary objective was to determine geographic patterns of organochlorine contamination within the northeastern U.S. population of Roseate Terns and to compare them with patterns observed in Common Terns.

114. D'Arcy, W. G. 1974. "Solanum and its close relatives in Florida USA." Annals of the Missouri Botanical Garden 61 (3): 819-867

115. Da Silveira L., L. S., and P. K. Swart. 1987. "Utilization of freshwater and ocean water by coastal plants of southern Florida USA." Ecology 68 (6): 1898-1905
The coastal vegetation of southern Florida is undergoing dramatic changes due to the instability of the ocean water-freshwater boundary. These vegetation changes will be determined by the response of each particular species to saline ocean water, particularly whether it can use ocean water or not. In this study, isotopic data were used to determine the relative usage of freshwater or ocean water by plants in the Florida Keys. The results indicate that, with some exceptions, plants toward the interior of the keys

were using freshwater while those toward the edge were using ocean water. A plot of the hydrogen and oxygen isotopic compositon of the plant water yielded a mixing line between typical freshwater values and those of ocean water. In general, the isotopic ratios of stem water for species found in hardwood hammocks were confined to the freshwater end of the line, followed by values of stem water from mangrove margin species. Species found in mangroves, however, had water with extremely variable isotopic ratios, ranging from values typical of ocean water to values typical of freshwater. This variability is consistent with the hypothesis that mangroves are fully capable of growing in freshwater, but are limited to saline habitats because of competitive exclusion by fast-growing glycophilic plants.

116. Darnell, R. M. 1985. "U.S. Gulf of Mexico continental shelf : an ecological overview." In Oceans '85, 'Engineering and the Environment,' San Diego, CA (USA), 12-14 Nov., 1985.
Trawl catch data representing over two and a half million fishes and penaeid shrimp and taken from the U.S. Gulf of Mexico continental shelf from the Rio Grande to the Florida Keys have been used to map the seasonal density distribution patterns of individual species and of species aggregates. The panoramic view of faunal distribution, thus obtained, provides a strong basis for informed management of the marine biological resources of this area.

117. Darovec, J. E., Jr. 1983. "Sciaenid fishes Osteichthyes Perciformes of western peninsular Florida USA." Memoirs of the Hourglass Cruises 6 (3): 1-73
Keys and diagnoses are given for the genera and 14 spp. of Sciaenidae [*Menticirrhus littoralis, M. saxatilis, M. americanus, Pogonias cromis, Micropogonias undulatus, Cynoscion nebulosus, C. regalis, Equetus lanceolatus, Pareques umbrosus, Pareques* sp., *Leiostomus xanthurus, Sciaenops ocellatus, Odontoscion dentex, Bairdiella chrysoura*] from western peninsular Florida. Summaries of published information on their distribution, life history, feeding, and salinity and temperature tolerances are presented. *Menticirrhus focaliger* Ginsburg and *C. arenarius* Ginsburg are considered synonyms under *M. saxatilis* (Bloch and Schneider) and *C. regalis* (Bloch and Schneider), respectively. Pareques Gill is treated at the generic level. Length frequency and gonad analyses indicated E. lanceolatus (Linnaeus) spawns in late spring and summer. The smallest ripe females were 132 mm in standard length. Similar analyses for P. umbrosus (Jordan and Eigenmann) proved inconclusive. Gut contents showed that these reef species feed mainly on crustaceans. Tribe level systematics, zoogeography, general life history and position in the food web are discussed for the species captured and related species. New hypotheses are presented concerning

intergeneric relationships, a demonstration of very different inshore and offshore sciaenid faunas in the study area and descriptions of several examples of allometric growth exhibited by sciaenids of the western Florida shelf. An appendix provides information on Florida sciaenids not found in the area covered.

118. Davis, G. E. 1982. "A century of natural change in coral distribution at the Dry Tortugas : a comparison of reef maps from 1881 and 1976." Bulletin of Marine Science 32 (2):608-623 Changes in coral reef structure and composition at Dry Tortugas, Florida were compared over a 95-year interval from benthic maps prepared in 1881 and 1976. Living hermatypic corals occupied less than 4% of the 23,000-hectare area mapped, and showed little change in area during the interval between maps. However, major changes in coral species distributions and reef types were apparent. In 1976, a lush 220-hectare *Acropora cervicornis* reef occupied what had been octocoral dominated hard bottom in 1881. The 44-hectare swath of *A. palmata* on the reef crest in 1881 was reduced to two small patches totaling less than 600 m2 in 1976. More than 90% of the extensive thickets of A. cervicornis) at Dry Tortugas were killed during the winter of 1976-77, apparently as a result of thermal shock. These changes in coral distribution and abundance demonstrated the natural dynamic nature of coral reefs, and showed the important role occasional short-term extreme climatic events can play in shaping coral reef structure and species distribution. The importance of protecting living corals and the value of ecosystem level sanctuaries as dynamic standards are discussed.

119. Davis, W. P. "Food exploitation of 13 species of pomadasyid fishes at Alligator Reef, Florida Keys USA." American Zoologist 9 (3): 616

120. Dawes, C. J. 1970. "Ecology of the algae of a Florida key. I, A preliminary checklist, zonation, and seasonality." Bulletin of Marine Science 20 (1): 165-185

121. Dawes, C. J. 1974. "Ecological studies of Floridian *Eucheuma* (Rhodophyta, Gigartinales). II, Photosynthesis and respiration." Bulletin of Marine Science 24 (2): 274-285

122. Dawes, C. J. 1974. Marine algae of the west coast of Florida. Coral Gables, Fla.: University of Miami Press.

123. Dawes, C. J. 1974. On the mariculture of the Florida seaweed, *Eucheuma isiforme* Springfield, Va.: Available from the National Technical Information Service. Florida Sea Grant Program Report, 5.
Because seaweeds containing the phycocolloid carrageenan do not

meet the demand, mariculture of *Eucheuma isiforme* in Florida is of interest. *E. isiforme* is common in the Florida Keys, is a perennial, has the highest yield of carrageenan, and grows rapidly. To determine if *Eucheuma* can be grown in Florida under controlled conditions to obtain an economically feasible product, mariculture procedures in either natural embayments or in culture tanks are discussed. Mariculture of *Eucheuma* in natural embayments would be restricted to only 2-3 harvests per year, herbivores and storms could decrease yields, and mixtures with other seaweeds would reduce the value of the harvest; however operating costs would be low. Culture tanks would eliminate or lessen these problems and permit year-around harvesting. A much higher crop per unit area than field culture ($9.72/m²/yr compared to $0.16/m²/yr) would result, but expenses for tank construction, water circulation, and temperature control would be greater. From the present understanding of the ecology and biochemistry of *E. isiforme*, mariculture seems feasible, pending pilot plant studies.

124. Dawes, C. J. 1977. "Seasonal and reproductive aspects of plant chemistry, and C-carrageenan from Floridian Eucheuma (Rhodophyta, Gigartinales)." Botanica Marina 20 (3): 137-147

125. Dawes, C. J., and E. W. Koch. 1988. "Physiological acclimation of the Caribbean seaweeds *Eucheuma isiforme* and *Solieria filiformis* (Rhodophyta Gigartinales) in culture." Caribbean Journal of Science 24 (3-4): 89-94
Photosynthetic and respiratory responses of fresh and cultured *Eucheuma isiforme* and *Solieria filiformis*, both red algae (Rhodophyta, Gigartinales), were measured under varying levels of irradiance (PI curves) and 12 combinations of temperature and salinity. Solieria filiformis from both the east and west coasts of Florida [USA] showed increases in productivity (Pm) after 4 and 8 weeks of culturing under controlled conditions with no shift in compensation point (Ic) or slope of the curve (alpha). The open water east coast and estuarine west coast populations had similar responses to 12 combinations of salinity (10, 20, 30 ppt) and temperature (10, 20, 30° C). Three distinct forms of *Eucheuma isiforme*, collected in 10 m of water off the west coast of Florida and from 0.5 to 1 m of water in the Florida Keys, showed a drop in productivity after 4 or 8 weeks in culture as well as a decrease in photosynthetic efficiency as shown by increases in Ic and decreases in alpha. All three populations of *E. isiforme* were intolerant of salinities of 20 ppt or below, and of temperatures as low as 10° C and all populations showed stress after 8 weeks in culture. The study demonstrates a strong acclimation ability of *S. filiformis* to light, temperature and salinity regardless of the site of origin, while the three X forms of *E. isiforme* showed limited tolerances to low

temperatures and salinity and no acclimation after culture.

126. Dawes, C. J., K. Bird, and M. D. Hanisak. 1988. "Physiological responses of transplanted populations of *Sargassum pteropleuron* Grunow in Florida USA." Aquatic Botany 31 (1-2): 107-124
Three populations of *Sargassum pteropleuron* Grunow were transplanted among sites on the Florida east and west coasts and Florida Keys. Significant increases in length and weight occurred at all three sites, with maximum growth rates of 0.08 doublings/day, and survival of 35-100%. Transplants showed an increase in irradiance-photosynthesis rates with regards to Ic and α when compared to the initial plants if transplanted to sites with higher turbidity, while transplants to clear water sites indicated decreases. All populations had broad tolerances to 12 combinations of salinity and temperature, prior to and after transplantation studies. Acclimation to new sites did not result in significant changes in proximate composition (ash, protein, carbohydrate, lipid, fiber and alginate). The species was found to have broad physiological tolerances, allowing for acclimation at sites of markedly different characteristics.

127. Dawes, C. J., N. F. Stanley, and D. J. Stancioff. 1977. "Seasonal and reproductive aspects of plant chemistry and iota carrageenan from Floridian *Eucheuma* (Rhodophyta : Gigartinales)." Botanica Marina 20 (3): 137-147
Six populations of *Eucheuma* were collected along the coasts of Florida [USA] seasonally and cystocarpic, tetrasporic, male and vegetative plants were separated. A deviant form of iota carrageenan was found in all forms, including 2 populations from the Florida Keys, *E. isiforme* and a form from Bahia Honda Key, and *E. nudum* collected from 3 distinct sites on the W and E coasts of Florida. *E. gelidium* from the Florida Keys contains a different form of iota carrageenan having lower levels of 3,6-anhydrogalactose and esterified sulfate and a distinctive IR spectrum. Analysis of seasonal collections of *E. isiforme*, the Bahia Honda form and 3 populations of *E. nudum* indicates that the iota carrageenan does not show changes in molar ratios of galactose to 3,6-anhydrogalactose to esterified sulfate throughout the year, although total protein, carrageenan, and carbohydrate did show cyclic changes. No differences were noted between tetrasporic and cystocarpic plants when molar ratios, IR spectra, or sulfate levels of the extracted (modified by lime or not) carrageenan were compared. Reproductive plants were uniform with regard to total protein, carbohydrate, ash level, and carrageenan yield.

128. Dawes, C. J., and R. H. Goddard. 1978. "Chemical composition of the wound plug and entire plants for species of the coenocytic green alga, *Caulerpa*." Journal of Experimental0

Marine Biology and Ecology 35 (3): 259-263
Levels of ash, NaOH-soluble protein, lipid, and TCA-soluble carbohydrate were determined in Caulerpa for both the entire plant and wound plugs produced by cutting the rhizomes or blades. The following species were examined: *C. ashmeadii, C. racemosa, C. prolifera, C. sertularioides, C. paspaloides, C. lanuginosa*, and *C. cupressoides*. They were collected along the west coast of Florida and the Florida Keys. Insoluble carbohydrate was estimated by subtraction. Wound plugs had higher ash levels and a distinctly higher level of total carbohydrate. Both entire plants and wound plugs had low levels of lipid and protein. Carbohydrate is the major component of the wound plug in *Caulerpa* in contrast to protein reported for *Bryopsis*.

129. De Ruyter van Steveninck, E. D. 1984. "The composition of algal vegetation in and outside damselfish territories on a Florida USA reef." Aquatic Botany 20 (1-2): 11-20
Algal species composition and relative abundance inside and outside territories of *Eupomacentrus planifrons* (Cuvier and Valenciennes) and *E. partitus* (Poey) were investigated in a reef formation at 6-m depth at Molasses Reef, John Pennekamp Coral Reef State Park, Key Largo, Florida Keys. In total, 43 spp. of eukaryotic fleshy and filamentous algae were found inside 9 investigated E. planifrons territories, 35 inside 10 E. partitus territories, and 22 in 6 samples from undefended areas. Cover of fleshy and filamentous algae, as well as mean number of species per unit of surface area, were significantly higher inside *E. planifrons* territories than inside territories of *E. partitus* ($P < 0.01$) or outside territories of both fish species ($P < 0.05$). Filamentous blue-green algae were conspicuous both inside and outside damselfish territories. Relative cover of crustose corallines did not differ significantly between the 3 categories. Territories of *E. planifrons* were characterized by red algae belonging to the family Gelidiaceae and small branched corallines. *Herposiphonia secunda* (C. Ag.) Ambr. was characteristic of *E. partitus* territories, while no particular algal species was characteristic of undefended reef areas. The absence of some algal species outside defended areas is an indication that these species escape grazing inside territories. The species composition inside territories of *E. planifrons* and *E. partitus* depends mainly on the recruitment of spores which settle inside these territories and on differences in competitive ability between the algal species. Although the damselfishes have a pronounced effect on the density of the vegetation, there is no indication that they influence the species composition by weeding activities or by selective grazing.

130. Dean, L. 1983. "Sponging : sheepswool sponges resurface on Florida Keys." Oceans 16 (2): 34-39

131. Decho, A. W. 1984. "Report of a cephalocarid *Lightiella incisa* : new record from the Florida Keys with notes on its habitat." Northeast Gulf Science 7 (1): 119-120

132. Decho, A. W., and J. W. Fleeger. 1986. "A new meiobenthic species of Laophonte (Copepoda : Harpacticoida) from the Florida Keys." Transactions of the American Microscopical Society 105 (1): 31-37
Laophonte confusa n. sp. is described.

133. Decho, A. W., W. D. Hummon, and J. W. Fleeger. 1985. "Meiofauna sediment interactions around subtropical seagrass sediments using factor analysis." Journal of Marine Research 43 (1): 237-256
Subtidal meiobenthic samples were collected from sediments within a seagrass bed (*Thalassia testudinum*) and an adjacent barren sand area in the Florida Keys [USA]. Fine-scale differences in sediment and heterogeneity, with respect to sediment grain parameters were analyzed using factor analysis. Sediment heterogeneity was related to meiofaunal distributions. Eighteen meiofaunal taxa representing 15 phyla were found. Nematodes comprised 58% of the total meiofauna. Eight gastrotrich, 26 harpacticoid, and 1 cyclopoid species were found. In comparing the seagrass area to the barren sand area by ANOVA, significant differences in density were noted for total meiofauna and polychaetes, but not for any other major taxa. The gastrotrich, *Mesodasys laticaudatus* and the harpacticoids *Scottolana canadensis*, *Peltidium* sp. and *Cletodes* sp. A showed significant differences with depth, area, and in the interaction of depth and area. Most harpacticoid species, nematodes, gastrotrichs and turbellaria showed their highest mean densities in the barren area. Polychaetes were most abundant in the seagrass area. [Other taxa include ostracods and oligochaetes]. Sediments were coarser at all depths in the barren area than in the seagrass area. Using factor analysis, sediments were classified into 5 sediment types. Stepwise linear regression of species abundance data on sediment types indicated that 4 of the sediment types were related to the distribution of 2 gastrotrich and 3 harpacticoid species ($P < 0.01$). Relationships of species with specific sediment types are discussed. For examining within-habitat differences in granulometry, factor analysis has provided sufficient resolution to examine the effects of fine-scale differences in sediment on meiofauna.

134. Deisler, J. 1987. "The ecology of the Stock Island tree snail *Orthalicus reses reses* (Say)." Bulletin. Florida State Museum. Biological Sciences 31 (3): 107-145
A study to determine the life history and behavior of the Stock Island Tree Snail, *Orthalicus reses reses* (Say)

(Pulmonata: Bulimulidae), was conducted during May-August 1981 and August-October 1982 in the southern Florida Keys. A follow-up assessment of these populations was conducted in July 1986. The activity of the snail was found to be linked to rainfall patterns. Statistical analysis indicated that population size was not limited by species of tree available for colonization. The diet of the snail was determined by stomach content analysis and substrate examination and was found to consist of epiphytic growths on tree surfaces. Reproductive events were observed and growth rate and sources of mortality were examined. The density and composition of a population on Stock Island were determined. Human activity was determined to have a negative impact on the Stock Island populations. Comparative data for *O. floridensis* and *O. reses nesodryas* were included where they were available.

135. Deyrup, M. A., N. Carlin, J. Trager, and G. Umphrey. 1988. "A review of the ants of the Florida Keys." Florida Entomologist 71 (2): 163-176

136. Dillon, J. R. 1969. "On the orientation of sea fans, genus *Gorgonia*." Biological Bulletin 136 (1): 130-139

137. Dineen, J. F., Jr. 1988. "Functional morphology of *Lithotrya dorsalis* (Cirripedia : Thoracica) in relation to its burrowing habit." Marine Biology (Berlin) 98(4): 543-555

138. Dodd, J. R., and C. T. Siemers. 1971. "Effect of late Pleistocene karst topography on Holocene sedimentation and biota, lower Florida Keys." Geological Society of America. Bulletin 82 (1): 211-218

139. Druffel, E. M., and T. W. Limick. 1978. "Radiocarbon in annual coral rings of Florida." Geophysical Research Letters 5 (11): 913-916
Radiocarbon measurements on a 175-year (A.D. 1800 to 1974) growth of the coral *Montastrea annularis* from The Rocks reef off the Florida Keys reveal the rate of local uptake of fossil fuel CO2 and bomb ^{14}C by surface ocean waters of the Gulf Stream. In the nineteenth century, the pre-bomb, pre-industrial delta-^{14}C value of surface ocean waters as seen in these corals of the Gulf Stream in the Florida Straits was $-51\pm2^{o}_{oo}$. By 1955, uptake of industrial CO_2 by these waters had lowered the δ-^{14}C values to about -61^{o}_{oo}. The results can be used to make predictions regarding anthropogenic CO_2 that can be expected to enter the oceans in future decades. Bomb produced ^{14}C is found to be present in the corals in comparable concentrations to that found in the dissolved inorganic carbon (DIOC) of the North Pacific and North Atlantic Oceans.

140. Duggins, C. F., Jr., K. G. Relyea, and A. A. Karlin. 1989.

"Biochemical systematics in southeastern populations of *Fundulus heteroclitus* and *Fundulus grandis*." Northeast Gulf Science 10 (2): 97-102
Four populations of *Fundulus heteroclitus* from the southeastern United States were compared electrophoretically to eight populations of *F. grandis* from Florida by using the products of 25 loci. Significant differences were found between *F. heteroclitus* and *F. grandis*. Only minor variation was found among the 8 populations of *F. grandis*, and the recognition of Gulf, Florida east-coast and Florida Keys populations as distinct species or subspecies was not supported. Therefore, the Florida Keys populations of *F. g. saguanus* are relegated to *F. g. grandis*.The name *F. g. saguanus* should apply, for now, only to Cuban material.

141. Dunson, W. A. 1980. "Adaptations of nymphs of a marine dragonfly *Erythrodiplax berenice* to wide variations in salinity." Physiological Zoology 53 (4): 445-452
Nymphs of the dragonfly, *E. berenice*, are common on rocky mangrove flats in the lower Florida Keys [USA] at salinities of 36-48 ppt [parts per thousand]. *E. berenice* appears to be the only truly marine odonate, and the nymphs tolerate wide variations in salinity. Hemolymph osmotic pressures for nymphs freshly captured in seawater or held in artificial seawater were 358-412 mOsm. There was little variation at salinities between freshwater and 260% seawater (2612 mOsm). In 300% seawater, hemolymph osmotic pressure rapidly increases to ~1000 mOsm and death ensues. The transition point between hyper- and hypoosmotic regulation occurred at ~350 mOsm seawater. Freshwater- and seawater-acclimated nymphs differ little in body water content (about 80%), but Na content is elevated from 50 to 89 µmol/g wet wt, respectively. In 35 ppt seawater, Na influx and efflux were approximately balanced near 400 µmol/100 g per h. In freshwater (1 mM Na), these fluxes decline to ~10 µmol/100 g per h. The time for complete turnover of body Na increases from 0.9 day in seawater to 21 days in freshwater. On rapid transfer from water of 470 mM Na to water of 1 mM Na, the Na efflux in 1 mM was only slightly higher than expected for freshwater-acclimated nymphs. At a water Na level of 0.25 mM, Na efflux increases greatly and there is a large net loss of Na. Water influxes of nymphs in distilled water or 35 ppt seawater were similar (33 and 40 µl/g per h, respectively); complete turnover of body water occurs in ~0.8 day. Nymphs of E. berenice rival the better known dipterans in osmoregulatory abilities and should be studied to compare mechanisms of hypoosmotic regulation that evolved independently in these 2 orders.

142. Dunson, W. A. 1981. "Behavioral osmo regulation in the Key mud turtle *Kinosternon baurii baurii*." Journal of

Herpetology 15 (2): 163-174
K. b. baurii, listed as threatened by the state of Florida, is still relatively common in favorable habitats in the lower Florida Keys. A total of 137 turtles were captured on the southern portion of Summerland Key, which is extensively man-altered; only 26 were trapped on uninhabited Johnston Key. Mark recapture rates indicate that total populations in these areas may be 1.6-2 times higher. *K. b. baurii* requires ponds that are < 15 $^{o}/_{oo}$ salinity for aquatic activity. Turtles given a choice preferred land when water salinity was above 17.5 $^{o}/_{oo}$ (50% sea water) but preferred water when the salinity was 8.5 $^{o}/_{oo}$ (25% sea water) or below. In the field, long periods may be spent on land in terrestrial retreats during times when unfavorable conditions exist in the ponds. A single retreat may be used repeatedly by the same turtle(s). Evaporative water loss was quite low (about 0.5% mass per day) in the laboratory and presumably also in the field during these periods of terrestrial activity. Individual turtles are extremely faithful to their home ponds and only rarely move to adjacent ones. The greatest density of turtles (59) was found in a small series of artificial ditches cut through the surface rock into the underlying fresh water lens. Density in natural ponds containing a minimum of 2 animals was related to the log of pond surface area. K. b. baurii is more tolerant of immersion in 35 $^{o}/_{oo}$ (100%) sea water than other kinosternids studied, including *K. b. palmarum*, but is not capable of long term survival. Its success in colonizing Lower Keys habitats is largely due to its ability to use terrestrial retreats when pond conditions are adverse.

143. Dunson, W. A., and C. R. Bramham. 1981. "Evaporative water loss and oxygen consumption of 3 small lizards from the Florida Keys USA, *Sphaerodactylus cinereus*, *Sphaerodactylus notatus*, and *Anolis sagrei*." Physiological Zoology 54 (2): 253-259
The standard rate of evaporative water loss (SRL) was defined as the mean of the lowest 25% of values recorded between 4 and 27 h after placement in the experimental chamber. The SRL of juvenile *S. cinereus* (the smallest lizards yet measured at a mean mass of 0.1 g) in dry air (13.0% mass/day) was similar to that of adults (11.3% mass/day). Adults of *S. notatus* had an SRL of 15.1% mass/day in dry air. At 75% relative humidity (RH) the SRL of both species decreased to about 7% mass/day. Rates of evaporative water loss in these 2 geckos are near the high end of the range of values reported for this genus. In contrast with the geckos, A. sagrei is active all day, but it has a similar SRL of 5.1% mass/day at 30° C and 75% RH. Under the same conditions fertile gecko eggs have rates of mass as low as 0.15%/day. The eggs are much more resistant to desiccation than the lizards themselves. Standard metabolic rates for *S. cinereus* and *S. notatus* were about 0.1 and 0.15 cm^3 O_2/g

· h at 26° and 30° C, respectively. The *A. sagrei* had a higher rate at 26° C of about 0.2 cm^3 O_2/g · h.

144. Dunson, W. A., and J. D. Lazell, Jr. 1981. "Urinary concentrating capacity of *Rattus rattus* and other mammals from the lower Florida Keys USA." Comparative Biochemistry and Physiology. A. Comparative Physiology 71 (1): 17-22
There is considerable variation in the renal medullary thickness (3.4-7.7) of 6 mammals from islands in the Lower Florida Keys. This appears to be correlated with differences in their abilities to survive without fresh or brackish drinking water. The black rat (*R. rattus*) had the highest predicted urine osmotic pressure and the highest measured urine concentration (4300 mOsm [mOsmole]). This species was a common inhabitant of remote mangrove islets lacking brackish water ponds and often even dry land. In captivity *R. rattus* maintained its body mass on a diet of rodent pellets (8% water) while drinking 26ppt (75% seawater). A 10 day acclimation was required. On 35ppt (100% seawater), mass losses considerably surpassed gains and death occurred in 7-9 days. Even the most salt tolerant mammal (*R. rattus*) from islands in the Florida Keys probably cannot utilize seawater for drinking. It must rely on preformed and metabolic water in its food, and possibly on a temporary lens of fresh water formed during rains for water intake. [Other species studied were *Odocolleus virginianum clavium*, *Procyon lotor auspicatus*, *Oryzomys argentatus*, *Sylvilagus near palustris* and *Sigmodon hispidus exsputus*.].

145. Dustan, P. 1977. "Besieged reefs of Florida's Keys." Natural History 86 (4):72-76

146. Dustan, P. 1977. "Vitality of reef coral populations of Key Largo, Florida : recruitment and mortality." Environmental Geology 2(1): 51-58.

147. Dustan, P. 1985. "Community structure of reef-building corals in the Florida Keys USA : Carysfort Reef, Key Largo, and Long Key Reef, Dry Tortugas." Atoll Research Bulletin 282-292:1-29
The species composition and zonation patterns of a coral reef are the result of species' differential abilities to settle, adapt, and survive the prevailing environmental conditions. The environmental parameters of light, water temperature and wave action, sedimentation, and food availability all have been thought to be of primary importance to corals. Biological interactions between and among species operate at organizational levels within this adaptive framework (Porter, 1974; Glynn, 1976; Connell, 1978). The interplay of biological and physical factors result in higher order interactions that determine community structure (Futuyma, 1979). Coral communities at both study sites show a positive

correlation between average colony size and percentage cover. On Long Key Reef increases in coral coverage are the result of all species becoming more abundant. On Carysfort Reef increases in cover are sometimes the result of single species dominance, as in the *Acropora palmata* zone, or a general increase in all species as seen on the fore-reef terrace.

148. Dustan, P., W. Jaap, and J. Halas. 1976. "The distribution of members of the class Sclerospongiae." Lethaia 9 (4): 419-420
Data on the distribution of sclerosponges from Grand Bahama Island and the Florida Reef Tract is presented. *Ceratoporella nicholsoni* was found living on the deep fore reef at 70 m and at 20 m inside a tunnel at Grand Bahama. A specimen of *Hispedopetra miniana* was collected with *C. nicholsoni* at 70 m. The distribution of sclerosponges may be limited by temperature. In the Florida Keys, surface temperatures reach 18° C during the winter months, and sclerosponges are apparently absent from the reefs. An alternative explanation for absence of sclerosponges from the Florida Reef Tract may be the absence of larvae to colonize the reef tract, since the water on the western side of the Florida Current originates in the Gulf of Mexico.

149. Dzurik, A. A. 1985. "Multiple-use conflicts in a growing economy." Journal of the Urban Planning and Development Division. ASCE 109(2): 79-93
Southwest Florida, USA, contains extensive beaches, barrier islands, estuaries, and wetlands. It has experienced rapid population growth, urbanization, and recreation pressures which have been in conflict with the natural systems of the region. This paper discusses conflicts between development and the environment, examines selected legislation, and reviews four cases of conflict: Rookery Bay, the Florida Keys, the Big Cypress Area, and Charlotte Harbour. Common to all cases are valuable ecosystems tied to the quantity and quality of land and water resources, but which have experienced rapid urbanization and depletion of those resources. Several state and federal laws are reviewed which provide management approaches for controlling development and protecting resources and the environment. The paper emphasizes the role of engineers and planners in balancing the economy and the environment, and suggests that they should play a major role in further strengthening legislation to protect environmental values.

150. Eden, G. P. 1988. "Hurricane Gilbert." Weather 43 (12)
The September 1988 hurricane Gilbert was described by meteorologists at the US National Hurricane Center in Miami as the most intense western-hemisphere tropical cyclone on record. Large areas of Jamaica were devastated. Greatest

loss of life, however, occurred in Mexico where Gilbert hit twice, first of all traversing the Yucatan Peninsula and two days later making landfall some 150 km south of the border with the USA, finally dissipating near the city of Monterrey. During its most intense phase at the western end of the Caribbean Sea, Gilbert was estimated to have a central pressure of 885 mbar, and maximum sustained winds in its circulation over 150 kn, with highest gusts in excess of 175 kn. The central pressure outrivalled the 899 mbar of 1980's hurricane Allen and the 892 mbar of the Florida Keys hurricane of 1935. This article gives an account of the development and progress of this storm.

151. Eiseman, N. J. 1970. "The green alga *Chalmasia antillana* from the Florida Keys." Phycologia 9 (1): 45-47

152. Eiseman, N. J. 1981. "Algae." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C.: U.S. Office of Coastal Zone Management. NOAA Technical Report CZ/SP, 1.

153. Emery, A. R. 1968. Comparative ecology of damselfishes (Pisces: Pomacentridae) at Alligator Reef, Florida Keys. Coral Gables, Fla.: University of Miami.

154. Emery, A. R. 1973. "Comparative ecology and functional osteology of 14 species of damselfish Pisces Pomacentridae at Alligator Reef, Florida Keys." Bulletin of Marine Science 23 (3): 649-770

155. Emiliani, C., J. H. Hudson, E. A. Shinn, and R. Y. George. 1978. "Oxygen and carbon isotopic growth record in a reef coral from the Florida Keys, USA, and a deep sea coral from Blake Plateau, Atlantic Ocean." Science (Wash, D.C.) 202 (4368): 627-629
Carbon and oxygen isotope analysis through a 30-yr (1944-1974) growth of *Montastrea annularis* from Hen and Chickens Reef (Florida Keys [USA]) shows a strong yearly variation in the abundances of both carbon-13 and oxygen-18 and a broad inverse relationship between the 2 isotopes. Normal annual dense bands are formed during the summer and are characterized by heavy and light oxygen. Stress bands are formed during particularly severe winters and are characterized by heavy carbon and heavy oxygen. The isotopic effect of Zooxanthellae metabolism dominates the temperature effect on the oxygen-18/oxygen-16 ratio. The isotopic results on the deep-sea solitary coral *Bathypsammia tintinnabulum*, where Zooxanthellae are nonexistent, indicates that the abundance of the heavy isotopes carbon-13 and oxygen-18 is inversely related to the growth rate, with both carbon and oxygen approaching equilibrium values with increasing skeletal age.

156. Erdtmann, B.-D. "Comparison of diagenetic environments of recent peritidal tepee structures in Florida Keys and in pre-Pliocene Tule Wash Formation near Wikieup, Mohave County, Arizona." Arizona-Nevada Academy of Science Twenty-Third Annual Meeting, Tempe, Arizona, 13-14 Apr 79.

157. Erseus, C. 1982. "Revision of the marine genus *Smithsonidrilus Brinkhurst* (Oligochaeta: Tubificidae)." Sarsia 67 (1)
On the basis of type material and new collections of NW Atlantic marine Tubificidae, the definition of *Smithsonidrilus* Brinkhurst, 1966, is considerably revised, and its only known species, *S. marinus* Brinkhurst, 1966, is redescribed. *S. marinus* is characterized by very complex male efferent ducts, the morphology of which was previously only fragmentarily known. The author distinguishes between *S. marinus marinus*, known from western and south-eastern parts of Florida, and *S. marinus westoni* subsp. n., which is recorded from off the eastern US coast (New Jersey through N. Carolina), the Bahamas, and Bermuda. The two subspecies differ from each other principally in the morphology of their spermathecae.

158. Erseus, C. 1988. "Taxonomic revision of the *Phallodrilus rectisetosus* complex (Oligochaeta: Tubificidae)." Proceedings of the Biological Society of Washington 101 (4): 784-793
A complex of small marine tubificids previously regarded as one variable species is revised, partly on the basis of new material from Belize, Barbados, Florida, Hawaii, Great Barrier Reef (Australia), Fiji and Aldabra atoll (Indian Ocean). Four different species are recognized: *Phallodrilus rectisetosus* Erseus, 1979, s.s., *P. deminutius* Erseus, 1979, *P. molestus*, new species, and *P. heronensis* Erseus, 1981. They are distinguished from each other by differences in the number of (both somatic and penial) setae and in the morphology of the spermathecae. All four species exhibit wide geographical distribution in the warmer parts of the world *P. rectisetosus* and *P. molestus*, at least, appear to be circumtropical.

159. Falls, D. L., and D. A. Textoris. 1972. "Size, grain type, and mineralogical relationships in recent marine calcareous beach sands." Sedimentary Geology 7 (2): 89-102
Ten samples of Recent marine carbonate beach sands from the Florida Keys, Bahamas, Virgin Islands, and Bermuda were analyzed for sorting parameters, grain genesis, and gross mineralogy. These sands are similar to other beach sands in their tendency toward negative skewness and leptokurtosis. Molluscan fragments are the major grain type in most samples. A decrease in molluscan fragments and an increase in 'unknown' material with decreasing size are the only major trends found

in grain type. Grain indentification was hampered increasingly in the finer classes by recrystallization (or micritization) and infilling of intragranular cavities either by lime mud or crystal growth. Correlation between aragonite content and molluscan fragments is positive. An increase in high-magnesium calcite with decreasing size is due to increase in foraminifers and coralline algae. The influence of the sublittoral biota is great, and tends to homogenize the beach sands even when they are from different parts of a large subtropical geographic area.

160. Farris, R. A. 1973. "On *Austrognatharia strunki*, new species from the Florida Keys, Gnathostomulida." Internationaleu Revue der Gesamten Hydrobiologie 58 (4): 577-586

161. Faulkner, B. M., and Albert V. Applegate. 1986. "Hydrocarbon exploration evaluation of Pulley Ridge area, offshore South Florida Basin (Evaluation de la prospection d'hydrocarbures dans la region de la Dorsale Pulley, Bassin South Florida offshore) : Gulf Coast Association of Geological Societies and Society of Economic Paleontologists and Mineralogists, Gulf Coast Section, 36th Annual Meeting. AAPG Bull 70(9): 1180

162. Feingold, J. S. 1988. "Ecological studies of a cyanobacterial infection on the Caribbean Sea plume *Pseudopterogorgia acerosa* (Coelenterata: Octocorallia)." In: Proceedings of the Sixth International Coral Reef Symposium, Townsville, Australia, 8th-12th August 1988. Volume 3, Contributed papers (Mini Symposium 11/16 to 22). Some scleractinian corals are susceptible to an infection called black band disease caused by the cyanobacterium *Phormidium corallyticum*. A similar disease, also caused by *P. corallyticum*, was discovered on colonies of the gorgonians *Pseudopterogorgia acerosa* and *P. americana*. In these gorgonians, the infection progressively denudes the skeleton of coenenchymal tissues as it moves along the main axis and peripherally onto branchlets. Subsequent colonization by macrophytic algae and epibiotic invertebrates smothers the remnants of living gorgonian tissue leading to further damage and possible death. Diseased colonies were found in 0.5 to 2.5 m water depth in the northern Florida Keys. Highest disease frequencies were found on *P. acerosa* during summer in the shallowest depth zone at Sands Key, Florida. The population of *P. acerosa* within a permanent quadrat slowly declined over 2 years at a rate slightly higher than disease frequency.

163. Fell, J. W. 1977. "Myzocytium, Haptoglossa, and Gonimochaete (fungi) in littoral marine nemotodes." Bulletin of Marine Science 27 (2): 177-207

164. Finlay, C. J. 1978. "Review of the genus *Bursa* in the western Atlantic." Nautilus 92 (4):147-150
Bursa (Bursa) pacamoni (Matthews and Coelho, 1971) of Brazil is reported from the Florida Keys, Cuba, Puerto Rico and Curaçao. *B. ranelloides*, of Japanese and Indo-Pacific waters, was found in deep water off Puerto Rico and Bermuda. The remaining species of the family Bursidae in the Western Atlantic that are reviewed include the following: *B. finlayi, B. tenuisculpta, B. thomae, B. corrugata, B. granularis cubaniana,* and *B. bufo.*

165. Fleminger, A., and E. Moore. 1977. "2 new species of Labidocera Copepoda Calanoida from the western tropical North Atlantic Ocean." Bulletin of Marine Science 27 (3): 520-529
Two new species of Pontellidae assignable to the *Labidocera jollae* species group, a uniquely American radiation of coastal planktonic copepods, are described. The new species originate from Barbados (*L. barbadiensis*) and the Caribbean coast off Panama (*L. panamae*). They are most similar to the Bahamian congener, *L. wilsoni*, of the 9 confirmed species of *Labidocera* now known from the western tropical Atlantic, *L. wilsoni, L. mirabilis* (southern Florida and the Florida Keys [USA]) and the 2 new species comprise an American east coast lineage related to and apparently derived from the American west coast lineage of the *L. jollae* group. The tropical west Atlantic lineage provides an excellent subject for intensive comparative analysis of planktonic speciation and character divergence. The species occupy a geographical region for which recent geological chronology is reasonably well established. The 4 spp. show close phylogenetic relationship, as evidenced by uniformity in morphology and habitat, and, with adequate sampling, geographical relationships may be defined with an unusually high level of precision. However, the distribution and density of this group is based on localized and scattered zooplankton sampling of coastal waters within the region.

166. Florida. 1990?. Florida Keys National Marine Sanctuary and Protection Act, Public Law 101-605.

167. Florida. Dept. of Natural Resources. Coastal Coordinating Council. 1974. Florida Keys Coastal Zone Management Study. Tallahassee, Fla.: The Council.
Florida statutes charge the Coastal Coordinating Council with development of a comprehensive plan for development, protection and zoning of the coastal zone. In response to this mandate, the National Coastal Zone Management Act of 1972, and a request from the governor, this study was conducted. This publication summarizes the Florida Keys Coastal Zone Management Study. The study condenses major findings and recommendations and contains an overview of the basic biophysical, socio-economic,

environmental quality, planning and management factors involved in the management of public resources in the Florida Keys. The study includes recommendations as to biophysical and environmental quality. These relate to: (1) coral reefs; (2) liquid waste management; (3) solid waste disposal; (4) urban runoff; (5) dredge and fill activities; and, (6) destruction of natural vegetation. Among the socio-economic conditions examined are: (1) land use analysis; (2) public support services; (3) land ownership; (4) Monroe County economy; (5) population growth trends; and (6) attitude and information study. An introduction contains the essence of policy planning, prerequisites for a Keys policy plan, and a map of the study area.

168. Foote, R. H. 1980. "Fruit fly genera south of the USA, Diptera Tephritidae." U.S. Department of Agriculture Technical Bulletin 1600:1-79
The 88 genera of fruit flies [from subfamilies Dacinae, Myopitinae, Oedaspidinae, Trypetinae and Tephritinae and tribes Terelliini, Ditrichini, Platensinini, Tephritini and Aciurini of the Tephritinae] in Mexico, Central America, the West Indies and South America are discussed. Keys to all genera are presented, and a synonymy, diagnosis and discussion of each genus are given. Included for each genus is information about its distribution, its relationship to other genera, its composition in terms of the species belonging to it, aids to its recognition and references for identifying its species. Several diagnostic characteristics and the wing of at least 1 sp. in almost every genus have been illustrated. Four genera, previously regarded as valid, have been synonymized with others, and 3 additional genera, long recorded from the region, are shown not to occur in the New World or to belong to other fly families. Fruit flies comprise the most economically important family of plant-inhabiting Diptera, considering the potential for agricultural damage by species of such genera as *Anastrepha, Ceratitis, Dacus and Rhagoletis*. Used in conjunction with the catalog of Tephritidae published in 1967, this bulletin provides a means of identifying about 2/3 of the > 600 spp. of fruit flies known to occur south of Texas and Florida.

169. Fotheringham, N. 1980. "Effects of shell utilization on reproductive patterns in tropical hermit crabs." Marine Biology (Berlin) 55 (4): 287-294
Littoral and sublittoral hermit crabs (*Coenobita clypeatus, Clibanarius tricolor, Calcinus tibicen, Petrochirus diogenes, Paguristes grayi, Pagurus miamensis, Paguristes tortugae, P. cadenati* and *Pagurus* sp.) were studied on Lighthouse Atoll, Belize. The *C. tricolor* population differed markedly in mean clutch size from congeneric populations at temperate latitudes and from conspecific populations in the Florida [USA] Keys. The differences are

primarily due to variation in shell utilization pattern, overlap with competitors and breeding season. Regression analyses indicate that shell weight, but not internal shell volume, affects the clutch size of *C. tricolor* in Belize, probably due to selection for optimum volume resulting in the use of broken and encrusted shells with high weight: volume ratios. Egg size and clutch size differed significantly among egg developmental stages in *C. tricolor*, *C. tibicen* and *P. miamensis*.

170. Fox, S. 1978. "Florida's area of critical state concern : an update." Florida Environmental and Urban Issues 5 (4): 6-10
Florida's Environmental Land and Water Management Act of 1972 (FLWMA) authorizes the designation of Areas of Critical State Concern (ACSC) and the review of developments of regional impact. The process, criteria, and consequences of designation of an ACSC are outlined. Once an ACSC has been designated, affected local governments have six months in which to submit acceptable land development regulations. Florida's first ACSC was the Big Cypress Swamp, a part of the Everglades National Park watershed. The state has attempted to reverse the water loss there caused by land speculators and farmers who dug canals to produce more dry land. The second ACSC was the Green Swamp, a major recharge area for the Floridan Aquifer. The Green Swamp's wetlands are the headwaters for five rivers. The third ACSC designated was the Florida Keys which now have the most comprehensive and complex regulations. The ACSC program and a new alternative resource management and planning program developed for the Appalachicola River Basin are analyzed. The author notes that the ACSC portion of the FLWMA has been declared unconstitutional by a lower court. The decision is being reviewed by the state Supreme Court.

171. Frederiksen, N. O. 1980. "Mid Tertiary climate of southeastern USA : the sporomorph evidence." Journal of Paleontology 54 (4): 728-739
Climatic affinities of modern genera [including *bryophytes, pteridopytes, gymnosperms, monocotyledons and dicotyledons*] represented by Late Eocene sporomorphs (spores and pollen grains) suggest that the climate of that time in southeastern USA was winter-dry tropical close to the Gulf of Mexico (similar to the Florida Keys of today) and marginal humid subtropical on the upper Coastal Plain (similar to coastal Louisiana today). Lack of change of the sporomorph assemblages suggests that the climate of southeastern USA did not change appreciably from late in the Middle Eocene until nearly the end of the Eocene. Then the climate rapidly became cooler and perhaps drier, a regime that persisted into the Early Oligocene.

172. Gaby, D. and Stephen Baig. 1983. "Gulf Stream variability and width." Mariners Weather Log 27(3): 133-134
A table provides a measure of Gulf Stream variability as determined by measuring the perpendicular distance from each light or buoy listed seaward to the mean inshore edge of the stream. This was done for every month for which data were available. An annual average variability and range of variability with standard deviation were determined. The greatest variability occurs in the region south of the lower Florida Keys, becomes progressively less as the stream rounds southeastern Florida, reaches a minimum off Palm Beach, increases to a secondary maximum near Frying Pan Shoals, and decreases as it begins to round Cape Hatteras. The great variability near the lower Florida Keys results from the influence of the Gulf of Mexico Loop Current upon the stream as it enters the Straits of Florida. Another table shows the average width of the Gulf Stream as determined by measuring the minimum distance between the mean inshore and offshore edge positions along a line drawn from each light or buoy where the mean monthly charts show both edges of the stream.

173. Gaby, R., ed. 1980. Key Largo Coral Reef Marine Sanctuary literature survey and water quality monitoring program. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 2.

174. Gallagher, S. B., and H. J. Humm. 1983. "*Centroceras internitens* n. sp. (Rhodophyceae, Ceramiaceae) from the western tropical North Atlantic Ocean." Journal of Phycology 19 (3): 261-268
Centroceras internitens n. sp. (Rhodophyceae, Ceramiaceae) was found in the Florida Keys and Bermuda only as an epiphyte on *Ceramium nitens* (C. Agardh) J. Agardh. It is described on the basis of many collections, including an abundance of reproductive material representing all stages of the life history. Laboratory culture has not been successful. The type locality is a well-known limestone platform on the Atlantic Ocean side of West Summerland Key, Florida Keys. In addition to living material, *C. internitens* was found on eight herbarium specimens of *Ceramium nitens* at the United States National Museum, thereby establishing records of its occurrence throughout the Caribbean Sea and dating back to 1887.

175. Genier, F. 1989. "A revision of the genus Hoplandria Kraatz of America north of Mexico, Coleoptera Staphylinidae Aleocharinae." Memoirs of the Entomological Society of Canada 150:1-59
A revision of the genus *Hoplandria* of America north of Mexico is presented. Four subgenera are recognized, of which two

(*Genosema* Notman and *Lophomucter* Notman) previously were given generic status and one (*Arrhenandria*) is here newly described. Twelve species are defined, of which eight are described as new: *H. alternans, H. isabellae, H. kisatchi, H. klimaszewskii, H. oconee, H. okaloosa, H. sanbornei,* and *H. smetanai*. The species are arranged according to their relationships into species groups within the subgenus Lophomucter where seven species are assigned. For the remaining subgenera species grouping was not possible due to the smaller number of species. The following synonymies are confirmed (the first specific name is valid): Subg. *Hoplandria. H. lateralis* (Messheimer) = *H. ochracea* Kraatz = *H. texana* Casey = *H. arizonica* Casey = *H. carinata* Casey; Subg. *Arrhenandria, H. laeviventris* Casey = *H. acudentata* Dury. The species *Genosema sexualis* Notman is here synonymized with *H. pulchra* Kraatz. *Hoplandria brittoni* Casey was previously regarded as a synonym of *H. lateralis* (Melsheimer); it is now considered as a junior synonym of *Platandria carolinae* Casey. Lectotypes are designated for *Gyrophaena lateralis* Melsheimer, *Hoplandria arizonica* Casey, *H. carinata* Casey, *H. laeviventris* Casey, *H. ochracea* Kraatz, *H. pulchra* Kraatz, and *H. texana* Casey. Keys to subgenera and species are provided. All species are described, diagnostic characteristics of each are illustrated with line drawings and scanning electron microscope photomicrographs, and all available bionomic and distributional data are given. The morphology, systematics, and phylogeny and the subgenera and certain species are discussed, and a checklist of Nearctic species is added.

176. Getter, C. D. 1981. "Ecology and survival of the Key silverside, *Menidia conchorum,* an Atherinid fish endemic to the Florida Keys." Dissertation Abstracts International. B, Sciences and Engineering 42 (4): 1293. University of Miami Ph.D. 138

The key silverside, *Menidia conchorum,* is studied as an indicator of adaptions to environmental conditions in lagoonal and ponded water habitats of the lower Florida Keys. Evidence is presented to support the current view of ichthyologists that *M. conchorum* is a valid species. It occurs in lagoons from Grassy Key to Key West, Florida. This lagoonal habitat is shared by a distinct community. Such lagoons are characterized by rapid fluctuations and broad ranges of physico-chemical parameters. *M. conchorum* feeds on planktonic crustaceans and terrestrial insects. Maximum size for females is about 58 mm (SL) and 50.1 mm for males. Maturation appears to take place at about 40 mm. The species appears to live one year or less in nature. Reproduction continues year-round with peaks in fertility in the spring and fall. Its population size is seasonal, with a low point in late summer and fall. Nearly all populations inhabit lagoons altered by man and the species is judged as

threatened with extinction.

177. Getter, C. D., G. I. Scott, and J. Michel. "Effects of oil spills on mangrove forests : a comparison of five oil spill sites in the Gulf of Mexico and the Caribbean Sea." In: Proceedings: 1981 Oil Spill Conference (Prevention, Behavior, Control, Cleanup), March 2-5, 1981, Atlanta, GA.,
Recent field studies at five oil spill sites where mangroves were effected provide a broad base of information on the response of mangrove communities to oiling. Three study sites in Florida (two in the Florida Keys, one in Tampa Bay) and two in eastern Puerto Rice were visited in 1978, 1979, and 1980. At each site, impacts on mangroves were assessed by the compartmental method, which uses statistical comparisons of ecological parameters between impacted and comparison stations and produces an array of biological and geomorphic data sets that allows spill sites to be compared. Despite many differences in the size of the spills and the spill sites, the responses of the oiled mangrove communities were similar in terms of tree mortality; leaf defoliation, deformation, and stunting; seedling deformation and mortality; lenticel expansion; adventitious growth of pneumatophores; and changes in the density and distribution of plants and animals. Each spill site differed mainly in the magnitude of the stress response. Observations of the spills showed that differences in the physical environment, such as the degree of exposure to waves and currents and geomorphic features like the terrain, greatly influence the distribution and persistence of oil within different mangrove forest types. From these studies, mangrove forest types can be ranked by their predicted sensitivity to oil. This differentiation in ranking increases the value of the Environmental Sensitivity Index, especially where it is desirable to assign priorities in a campaign to protect oil-sensitive habitats from oil spills along mangrove-dominated coastlines. (Author's abstract).

178. Getty, T., and B. A. Hazlett. 1978. "Decoration behavior in *Microphrys bicornutus* (Latreille, 1825) (Decapoda, Brachyura)." Crustaceana 34 (Pt. 1):105-109

179. Gittings, S. R. 1985. "Notes on barnacles *Cirripedia thoracica* from the Gulf of Mexico." Gulf Research Reports 8 (1): 35-42
Examination of several collections of barnacles from the northern and western Gulf of Mexico made over the last 30 years has improved our knowledge of the distributions of several taxa previously considered to be absent or rare in those regions. *Conchoderma auritum* (Linnaeus) and *Heteralepas* sp. aff. *cornuta* (Darwin) are recorded for the

first time from the Gulf of Mexico. *Conchoderma auritum, Conchoderma virgatum* (Spengler), *Heteralepas cornuta* (Darwin), *Balanus trigonus* (Darwin), *Balanus venustus* Darwin, and *Balanus amphitrite amphitrite* Darwin have broad distributions outside the Gulf of Mexico. *Tetraclita stalactifera stalactifera* (Lamarck) is abundant in the intertidal zones of the southwestern Gulf but rare elsewhere in the Gulf of Mexico outside the Florida Keys. Spatial segreation of *Octolasmis hoeki* (Stebbing) and *Octolasmis lowei* (Darwin) on a host crab is discussed.

180. Goforth, J. H. W., and J. R. Thomas. 1980. Plantings of red mangroves (*Rhizophora mangle* L.) for stabilization of marl shorelines in the Florida Keys, final report, Jul 77-May 79. S.l.: s.n.
Shoreline stabilization using mangrove plantings offers an environmentally and economically superior alternative to the construction of seawalls, riprap, etc. Three developmental stages of red mangroves (i.e., propagules, seedlings and small trees) were planted to provide erosion protection along three separate sections of marl shoreline at Key West, Florida. Mangrove propagules ('beans') which were carefully removed from mature fruits or collected from shoreline debris exhibited the greatest vertical growth. However, survival of this stage ranged from 86-14% (X = 45%) and was inversely related to the degree of shoreline exposure. Seedlings (approximately 1 year old) did not exhibit a significantly greater survival rate (X = 48%) or vertical growth than propagules. Transplants of small mangrove trees(i.e., approximately 2-3 years old) were highly successful on all three shorelines exhibiting an average survival of 98% after 23 months. Degree of exposure to erosion and/or burial proved more important in determining seedling survival than either of the organic amendments or tidal heights tested. Using a power auger to bore holes and seagrass wrack as mulch proved to be an effective and economical method of planting all three developmental stages of red mangroves along organically deficient marl shorelines. However, marl shorelines exposed to moderate wave, tidal, or wind action are best planted with small mangrove trees to insure transplant survival and erosion protection. (Author).

181. Goldberg, W. M. 1971. "A note on the feeding behavior of the snapping shrimp *Synalpheus fritzmuelleri* Coutiere (Decapoda: Alpheidae)." Crustaceana 21 (3): 318-320

182. Goldberg, W. M. 1976. "Comparative study of the chemistry and structure of gorgonian and antipatharian coral skeletons." Marine Biology 35 (3): 253-267

183. Goldberg, W. M. 1978. "Chemical changes accompanying maturation of the connective tissue skeletons of gorgonian and antipatharian corals." Marine Biology 49(3):203-210
The skeletons of the following 3 gorgonian and 2 antipatharian corals were subjected to quantitative chemical analysis: *Muricea muricata, Swiftia exserta, Gorgonia ventalina, Cirrhipathes luetkeni,* and *Antipathes rhipidion.* Gorgonians were from the Florida Keys and antipatharian corals from Jamaican waters. Protein values ranged from 70.4 to 93.6%; ash from 3.0 to 19.4%; lipid from 0 to 8.4%; carbohydrate from 1.24 to 3.94%; and halogen from 4.2 to 24.9% of the dry skeletal wt. Hydroxyproline and phenolic values were 0 to 3.0% and 11.6 to 25.0% of the protein, respectively. Lipid, present in 2 gorgonian species and 1 antipatharian, significantly decreased with age in all 3 cases. Glucose and galactose accounted for K90%, and sialic acids for an additional 1 to 10%, of the carbohydrate in the gorgonian skeletons studied; the glucose content of the gorgonian skeleton decreased with age. The antipatharian skeletons had no glucose or galactose but contained significant levels of amino sugars; the presence of chitin was confirmed. In the gorgonians, Br and I, the predominant halogens, increased with skeletal age and were present in nearly equal amounts. Small amounts of bromine were found in the antipatharian skeletons, but very large amounts of I were found in older parts of the skeleton. The basal regions of both antipatharian species contained K23% by wt of I, the highest content of I yet recorded for any organism.

184. Goldberg, W. M., J. C. Makemson, E. D. Gomez, C. E. Birkeland, R. W. Buddemeier, R. E. Johannes, J. A. Marsh, Jr., and R. T. Tsuda, editors. 1981. "Description of a tumorous condition in a gorgonian coral associated with a filamentous green alga." In The reef and man : proceedings of the Fourth International Coral Reef Symposium. Volume 2. Quezon City, Philippines: Marine Science Center, University of the Philippines.
A tumorous condition affecting the skeleton of a gorgonian coral (*Pseudoplexaura* spp.) is widespread in the Florida Keys. Incidence of infected colonies, while not strictly density dependent is associated with patch reef areas where *Pseudoplexaura* densities are greater than 0.7 m^2. Larger coloneis (> 80 cm tall) are 2.5 times as likely to possess tumors as smaller individuals. The tumor consists of masses of filamentous green algae that separate the normally tightly apposed laminae of the gorgonian skeleton. Histological examination of these infected areas shows that filaments are primarily confined to the acellular skeletal region and do not appear to affect the functional morphology of the polyps. However, the axis epithelium is anaplastic and apparently dysfunctional. These cultural observations

diagnose the alga a member of the genus *Entocladia* Reinke 1879.

185. Golden, J. H. 1973. "Scale interaction implications for the waterspout life cycle : 8th Conference on Severe Local Storms." Bulletin of the American Meteorological Society 54 (6): 611-612
The high formation frequency and previously documented life cycle of Florida Keys' waterspouts are shown to result from energy and momentum cascades through five scales of atmospheric motion: (1) funnel scale, the waterspout itself, with funnel diameter from ten to 500 ft; (2) the new spiral scale, from 500 to 3000 ft at the sea surface; (3) individual cumulus cloud scale, from less than one to five miles; (4) cumulus cloud line scale, from five to 100 mi; and (5) synoptic scale, several hundred miles in horizontal extent.

186. Golden, J. H. 1973. Scale interaction implications for the waterspout life-cycle." In: Conference on Severe Local Storms, 8th, Denver, CO., Oct. 15-17, 1973, Preprints. [Boston, American Meteorological Society, 1973. p. 207-212

187. Golden, J. H. 1973. "Some statistical aspects of waterspout formation." Weatherwise 26 (3): 108-117

188. Golden, J. H. 1974. Life cycle of Florida Keys' waterspouts. Norman, Okla.: United States National Oceanic and Atmospheric Administration, Environmental Research Laboratories, National Severe Storms Laboratory. NOAA Technical Memorandum ERL NSSL, 70.

189. Golden, J. H. 1974. "The life cycle of Florida Keys' waterspouts. I." Journal of Applied Meteorology 13 (6):676-692
Detailed multi-faceted analyses show that waterspouts have a characteristic life cycle consisting of five discrete but overlapping stages: 1) the dark spot, a prominent light-colored disc on the sea surface surrounded by a dark patch, diffuse on its outer edges, which represents a complete vortex column from cloud base to sea surface; 2) the spiral pattern, the primary growth phase of the waterspout, characterized by alternating dark- and light-colored surface bands around the dark spot; 3) the spray ring (incipient spray vortex), concentrated around the dark spot, with a lengthening funnel above; 4) the mature waterspout (spray vortex), the stage of maximum overall organization and intensity; and 5) the decay stage, when waterspout dissipation (often abrupt) is initiated by cool downdrafts from a nearby developing rain shower.

190. Golden, J. H. 1977. "An assessment of waterspout frequencies along the U.S. East and Gulf Coasts." Journal of Applied

Meteorology 16 (3): 231-236
Ship reports dating back to the 1880's and 'Storm Data' reports for the period 1959-1973 were used to assess the threat posed by waterspouts to existing and proposed floating offshore nuclear power plants along the U.S. East and Gulf Coasts. In particular, it was found that the primary warm axis of th Gulf Stream and large coastal bays and inland waterways are favored regions of waterspout occurrence. A list of the ten most active coastal regions, in terms of reported waterspouts per unit area, was synthesized. It was shown that after the Florida Keys, the most prolific waterspout region is the entire southeast Florida Coast (Stuart to Homestead). Tampa Bay has had the greatest number of damaging waterspouts.

191. Golden, J. H. 1981. Waterspout research. Norman, Okla.: United States National Oceanic and Atmospheric Administration, Environmental Research Laboratories, National Severe Storms Laboratory. NOAA Technical Memorandum ERL NSSL, 90.
Many of the damaging tornadoes affecting the central and eastern Gulf Coast during the late fall and early spring originate over the northern Gulf of Mexico as intense waterspouts. Maximum rotational wind speeds as high as 85 m/sec have been measured by photogrammetric techniques in the lowest 10-15 m MSL for large Florida Keys waterspouts. Objects weighing up to five tons have been carried 30 m or more by tornadoes moving over coastal waterways out to sea. A table lists ten of the most active areas along the entire U.S. Gulf and East coasts. The Florida Keys experience from 50-500 waterspouts each year. Tampa Bay has the greatest number of damaging waterspouts, half or more of which originate over the Gulf of Mexico during midlatitude disturbances.

192. Golden, J. H., and Daniel Purcell. 1978. "Life cycle of the Union City, Oklahoma, tornado and comparison with waterspouts." Monthly Weather Review 106 (1): 3-11
A major tornado struck the small farming community of Union City, OK., on May 24, 1973. It was on the ground 26 min, attaining a maximum width (at cloud base) of nearly 600 m. Even though the funnel narrowed toward the ground, the width of the damage path equalled funnel width at cloud base consistently. The tornado life cycle consisted of four distinct parts: organizing stage (visible funnel touching ground intermittently with continuous damage path), mature stage (tornado at largest size), shrinking stage (entire funnel decreasing to thin column), and decaying stage (fragmented, contorted funnel). Even in its final stages, the tornado retained its destructiveness. The tornado life cycle resembles, in many aspects, that typical of Florida Keys waterspouts. Both begin with surface evidence of vortex existence before a visible funnel cloud has descended a significant distance toward the surface. Approaching the

mature stage, the tornado and waterspout exhibit spiral inflow characteristics with a distinct boundary between warm, moist air and cool, dry air. The cooler air mass from a nearby precipitation area apparently cuts off flow of warm, moist air into the tornado's circulation, leading to vortex decay. The visible funnel becomes thin, increasingly tilted, and distorted as it dissipates. Major differences between the tornado and waterspout appear to be vortex and parent cloud scales and, to a lesser extent, vortex lifetimes and intensities. Both vortices may evolve rapidly through their respective life cycles without evolving through every stage.

193. Goodman, J. D. 1988. "New auriculate telorchiid trematodes, including two new species of *Auritelorchis*, and erection of *Allotelorchis* n. gen. and *Allotelorchiinae* n. subf. (Trematoda: Telorchiidae)." Transactions of the American Microscopical Society 107 (4): 362-368
Auritelorchis harwoodi sp. nov. is described from 5 specimens in the intestine of a black swamp snake, Seminatrix pygeae, in Florida, USA. The new species resembles *A. dollfusi*, but differs from it in that the ovary is as large as or larger than the testes, the cirrus sac does not reach the ovary, the acetabulum is smaller, the extent of the vitellaria, and in much larger body length (8-12 mm). *A. mcdonaldi* sp. nov. is described from a single specimen from the intestine of a Bells eastern hinged tortoise, *Kinixys belliana belliana*, taken at Karuma Falls, Uganda. The new species differs from *A. bifurcus* (the only other testudine telorchiid with auricular lappets) in the oral sucker being larger than the acetabulum, in the position of the ovary midway along the vitellaria and in the cirrus sac being far anterior to the ovary. *Auritelorchis* is transferred from Auridistominae to Telorchiinae. *Auridistomum thomasi* is transferred to the new genus *Allotelorchis*, and this genus is placed in the new subfamily Allotelorchiinae. Keys are given for the subfamilies and genera in Telorchiidae.

194. Goodyear, N. C. 1987. "Distribution and habitat of the silver rice rat *Oryzomys argentatus*." Journal of Mammalogy 68 (3): 692-695

195. Goodyear, N. C. 1989. Spatial overlap and dietary preference of the native silver rice rat (*Oryzomys argentatus*) and the exotic black rat (*Rattus rattus*) in the Florida Keys (rat). Kingston, R.I.: University of Rhode Island.
Habitat choice and space use by silver rice rats (*Oryzomys argentatus*) and black rats (*Rattus rattus*) were studied where the species occurred sympatrically in the Florida Keys. *O. argentatus*, a rare endemic rodent, and *R.*

rattus, an exotic species, have coexisted for less than 500 years. Fine-scale movements and behavior revealed by fluorescent trails produced from neck-attached capsules showed the degree of overlap in use of spatial and some food resources in free ranging animals. Food selection and preference tests were conducted in the laboratory. Significant differences in vegetation association, behavior, arboreality, and diet were found. Estimates of spatial niche overlap, using four common indices, suggested the differences were biologically less significant; the average value of four estimators on the habitat choice resource axis was 89%, a value higher than reported in most closely comparable studies for 47 of 48 pairwise comparisons of native rodent species. I suggest that silver rice rat populations may be jeopardized by the presence of black rats, as invasion of *R. rattus* has been reported to have caused oryzomine extinctions in the Galapagos and Antillies. A new method for studying fine-scale habitat use in small mammals was developed. A dispensing capsule containing fluorescent dust, controlled by a motion activated valve, allowed precise determination of habitat use. The trail can be followed under ultraviolet light. Unlike other dust tracking methods, this technique allowed long-term tracking and trail deposition in sparsely vegetated areas. The capsule was light-weight, did not interfere with animal movement, and allowed the researcher to leave the study site during an animal's active period. The tag was used successfully with the black rat and three endangered mammals: the Key Largo woodrat (*Neotoma floridana smalli*), the Chinese pangolin (*Manis pentadactyla dalmanni*), and the silver rice rat. The dust capsule technique revealed fine-scale use of habitat and resources, information useful in management plans for threatened or endangered species.

196. Goodyear, N. C., and J. D. Lazell, Jr. 1986. "Relationships of the silver rice rat *Oryzomys argentatus* (Rodentia : Muridae)." Postilla 198:1-7
Nine skulls of the rare *Oryzomys argentatus* are compared to 109 skulls of the six races of *O. palustris*. Mahalanobis distance is greater between *O. argentatus* and all Floridian forms of *O. palustris* than the Floridian forms are from each other. In a canonical discriminant analysis, two models grouping *O. argentatus* with one or both of the insular races of *O. palustris* (sanibeli and planirostris) were shown by the Roy's Greatest Root statistic to fit the data less well than a model in which *O. argentatus* was regarded as distinct. A one-way ANOVA and Ducan's Multiple Range Test on the variation in nasal bone proportions show that there are two significantly different groups of these Oryzomys ($p < 0.05$): all *O. palustris* together and *O. argentatus* alone. We hypothesize *O. argentatus* originated on the Lower Keys [USA]

in the late Sangamon and underwent selection for character divergence in sympatry with *O. palustris* during the Wurm.

197. Gore, R. H. 1981. "Decapod crustaceans." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

198. Gore, R. H. 1981. "3 new shrimps and some interesting new records of decapod Crustacea from a deep water coral reef in the Florida Keys USA." Proceedings of the Biological Society of Washington 94 (1): 135-162
A small collection of 55 specimens of decapod crustaceans, obtained using a research submersible on a deep-water coral reef off Key Largo, Florida, produced 1 new genus and 3 new species of natantian shrimp, plus several major range extensions to the continental USA [*Pontoniopsis, Alpheopsis trispinosus* (Stimpson), *Nematopaguroides* cf. *fagei* Forest et St. Laurent, *Pseudocoutierea antillensis* Chace] for other decapods. The new taxa included *Veleroniopsis kimallynae* gen. et sp. nov. and *Pontoniopsis paulae,* sp. nov. in the Palamonidae and *Odontozona libertae* in the Stenopodidae. The discovery of new taxa in depths of < 100 m suggests that the cryptic coral-associated decapod crustacean fauna may be richer than previously suspected.

199. Gore, R. H., and L. E. Scotto. 1979. "Crabs of the family Parthenopidae (Crustacea Brachyura: Oxyrhyncha) with notes on specimens from the Indian River region of Florida." Memoirs of the Hourglass Cruises 3 Part VI: 1-98
Eight species (*Cryptopodia concava, Heterocrypta granulata, Mesorhoea sexspinosa, Parthenope agona, P. fraterculus, P. serrata, P. granulata,* and *Solenolambrus tenellus*) in 5 genera of parthenopid crabs were captured in a 28-mo systematic sampling program at 10 stations (6-73 m) along 2 transects in the Gulf of Mexico on the central western Florida shelf. The collections were supplemented by additional material (including an additional species, P. pourtalesii), sampled over a 2-yr period (1973-75) from the continental shelf along the central eastern Florida coast. Twenty-two species of the family Parthenopidae are known from the western Atlantic; 12 occur in the Gulf of Mexico. Species considered are tropical in affinity, with only 2 (*P. pourtalesii and H. granulata*) occurring farther north than Cape Hatteras. Four additional Floridan species (*Leiolambrus nitidus, S. decemspinosus, S. typicus,* and *Tutankhamen cristatipes*) not collected during either survey are treated. Morphology, distribution, type-locality, keys, stomach content analyses, behavior, and habitat are discussed.

200. Gorham, J. C. 1988. The effects of manmade structures on nearby resident fish communities (Florida Keys, reefs). Melbourne, Fla.: Florida Institute of Technology.
The effects of artificial reef deployment on fish communities residing in areas surrounding deployment sites were quantitatively measured. Two experimental arrays of twelve small (2 x 1 x 0.5 m) artificial reefs made up of 2" PVC pipe and concrete blocks were deployed in highly similar habitat in the Looe Key National Marine Sanctuary, Florida Keys, U.S.A. One array was designated as "control" while the other was designated "experimental". Both arrays were allowed to recruit for over a full year. Fishes inhabiting sand plain habitats in two 6 hectare study sites in the vicinity of the two artificial reef arrays were censused prior to reef deployment, and then quarterly for over one year. Statistical comparison of these data resulted in no significant changes in species richness, total numbers of adult and juvenile fishes, or population densities of the five most abundant species. Fishes residing on all reefs were censused regularly. Standing stocks inhabiting the arrays stabilized in about 4-6 months. One year after deployment of these arrays, a comparatively large artificial reef made of 2" PVC pipe and concrete blocks was deployed in the center of the "experimental" array. Fish aggregating devices (FADs) were positioned about 1-2 m above this reef to increase the effective surface area and structural complexity. Nine months after installation of this large central reef, the standing stocks of adult fishes (excluding Apogon spp.) residing on the experimental array had increased by over 100%, but remained essentially unchanged in the control array. These fishes were mainly snapper (Lutjanidae) and grunt (Haemulidae). Our results demonstrate that, at least in some contexts, artificial reefs can result in an increase rather than a redistribution of standing stocks of local resident fishes, without notable effects on prior resident fish communities in the surrounding habitats.

201. Gorham, J. C., and W. S. Alevizon. "Habitat complexity and the abundance of juvenile fishes residing on small scale artificial reefs : Fourth International Conference on Artificial Habitats for Fisheries, Miami, Florida, USA, November 2-6, 1987. Bulletin of Marine Science 44 (2): 662-665.

202. Goy, J. W., and D. L. Felder. 1988. "Two new species of *Microprosthema* from the western Atlantic (Crustacea: Decapoda Stenopodidae)." Journal of Natural History 22 (5): 1277-1292
Two new species of shrimp in the genus *Microprosthema* are described and figured on the basis of materials collected

recently from the tropical western Atlantic. Specimens of one, *Microprosthema manningi*, have been collected from Florida [USA], Mexico, Belize and Old Providence Island. The other new species, *Microprosthema looensis*, was taken from a single site in the Florida Keys. *Microprosthema manningi* is closely related to the western Atlantic *M. semilaeve*, while *M. looensis* is closely related to the Indo-Pacific *M. scabricaudatum*. However, both new species can be distinguished by numerous morphological differences, as well as by coloration.

203. Gregory, B. M., Jr., and C. S. Barfield. 1989. Guide to the identification of some Lepidoptera eggs found on Florida soybean, *Glycine max* (L.) Merr. Monograph Agricultural Experiment Stations, University of Florida, 15
This publication is a guide to the identification of the eggs of some species of Lepidoptera encountered on soyabean in Florida. It contains photographs, descriptions and a key to the eggs of the noctuids *Anticarsia gemmatalis, Plathypena scabra, Mocis latipes, Pseudoplusia includens* [*Chrysodeixis includens*], *Heliothis zea* [*Helicoverpa zea*] and *Heliothis virescens*, the hesperiid *Urbanus proteus* and the lycaenid *Strymon melinus*.

204. Gregory, D. R., Jr., and R. F. Labisky. 1981. "Ovigerous setae as an indicator of reproductive maturity in the spiny lobster *Panulirus argus*." Northeast Gulf Science 4 (2): 109-114

205. Gregory, D. R., Jr., and R. F. Labisky. 1986. "Movements of the spiny lobster *Panulirus argus* in South Florida." International Workshop on Lobster Recruitment.
Long-distance movements of the spiny lobster *Panulirus argus* were studied in two Gulf of Mexico habitats (Shallows, Mid-depth) and three Atlantic Ocean habitats (Shallows, Patch Reef, and Deep Reef) in the lower FLorida Keys during the mid-1970's. Of 6062 spiny lobsters tagged and released at the five sites between June 1975 and August 1976, 465 of the 771 (13%) lobsters recovered yielded usable movement data. Eighty percent of the tags were recovered within the first 3 mo of the 8 mo commercial fishing season (July 26 - March 31). Directions and rates of movements differed significantly ($P < 0.05$) among sites. Movements from Gulf sites were generally oriented to the west and southwest, toward the Atlantic offshore reefs, at mean displacement velocites of 0.57 km/d (Mid-depth) and 0.24 km/d (Shallows). Movements of lobsters from the Atlantic sites were principally eastward and westward, parallel to the reef line and island chain, at mean displacement velocities of 0.02 km/d (Deep Reef) and 0.05 km/d (Shallows, Patch Reef).

206. Gregory, D. R., Jr., R. F. Labisky, and C. L. Combs. 1982.

"Reproductive dynamics of the spiny lobster *Panulirus argus* in south Florida, USA." Transactions of the American Fisheries Society 111 (5): 575-584
The reproductive biology of the spiny lobster *P. argus* was studied in 2 Gulf of Mexico habitats and 3 Atlantic Ocean habitats in the lower Florida Keys during July, 1975-Aug. 1976. The minimum size of reproductive maturity, expressed by carapace length (CL), was 70 mm; none of 1208 females smaller than 70 mm CL was ovigerous, and only 11 (< 1%) possessed spermatophores. Reproductive activity was greatest among females in the 80-85 mm size class. Reproduction occurred during April-Sept., but was most prevalent in May and June. Active reproduction was restricted to the Atlantic reef habitats; none of 792 mature Gulf females was reproductively active; 21% of 1235 mature Atlantic females was ovigerous or spermatophoric. Sex ratios varied with season and habitat; females were more prevalent in those seasons and habitats most closely associated with reproductive activity. Legally protected females (< 76.2 mm CL) contributed only 14% of the annual egg production. The most productive size class consisted of females newly recruited to the fishery (75-85 mm CL); these females contributed about half (48%) of the total annual egg production. The reproductive potential of this lower Florida Keys spiny lobster population may not be protected adequately by the current minimum legal size limit. This assessment of the reproductive dynamics of *P. argus* in Florida suggests that a new minimum size limit of 85 mm CL should be adopted.

207. Haack, R. A. 1985. "Voltinism and diurnal emergence-flight patterns of *Ips calligraphus* (Coleoptera: Scolytidae) in Florida, USA." Florida Entomologist 68 (4): 658-667
Field studies revealed that *Ips calligraphus* (Germar) may complete up to nine generations during a 1-year period in north-central peninsular Florida. Brood development took place in felled trees of slash pine, *Pinus elliottii* Engelmann var. elliottii, with thick phloem (2.5-3.5 mm; i.e., > adult pronotal width). Generational times ranged from 27 days in the summer to 81 days in the winter. Generally, female brood adults emerged earlier than did males of the same cohort; the male:female ratio was ca. 1:1.2. Adult emergence-flights occurred as a single peak during late afternoon in spring (mostly from 1500-1700 h EST) and fall (1400-1700 h), compared to near midday in winter (1200-1400 h), emergence-flights were bimodal during summer with activity peaking in early morning (0700-0900 h) and early evening (1700-1900 h). An average of 457° D (day-degrees) above a 10° C (822° D above 50° F) threshold were accumulated per generation using the mean-minus-threshold method of day-degree estimation. Based on weather records for Florida, the theoretical number of generations per year in

slash pine trees with thick phloem was estimated to vary from as few as 7 near Pensacola to as many as 12 in the Florida Keys.

208. Hall, M. O. 1988. Dynamics and interactions of epiphytic macroalgae and meiofauna on the seagrass *Thalassia testudinum*. Tampa, Fla.: University of South Florida. The composition and abundance of epiphytic macroalgae and meiofauna on the seagrass *Thalassia testudinum* Banks ex Konig were quantitatively described over a 15 month period near Egmont Key, Florida. Field collections and experiments examined the relationship between the abundance of epiphytic algae on *T. testudinum* blades, and the density of associated epifauna. Twenty-five species of epiphytic macroalgae were identified with encrusting red (*Fosliella farninosa*) and brown algae (*Myrionema orbliculare)* dominating the epiphytic community year round. Percent cover of epiphytic algae was inversely related to mean blade length, and varied both vertically and horizontally along blades. These small-scale distributional patterns of epiphytic algae were species specific. Harpacticoid copepods and nauplii, and nematodes were the most abundant meiofauna on *Thalassia testudinum* at Egmont Key. Fourteen species or species complexes of harpacticoid copepods were identified, and *Harpacticus* sp. numerically dominated the community (47.8% of total copepods). Copepodites dominated the population structure of the 6 most abundant harpacticoids, and were always present, indicating continuous reproductive activity. Densities of harpacticoid copepods, nauplii, and nematodes were positively associated with percent cover of filamentous algae over the study. Sixty-eight percent of all significant correlations between meiofaunal density and cover of epiphytic algae involved filamentous algae, although encrusting algae dominated the epiphytic community. Samples collected in December 1983 at Egmont Key indicated a significant positive association between the densities of harpacticoid copepods, nauplii, nematodes, and amphipods and the biomass of the dominant epiphyte, Giffordia mitchelliae, a filamentous brown alga. Some harpacticoid taxa were more strongly associated with the amount of epiphytic algae than others. Recolonization experiments with both real and artificial *G. mitchelliae* and *T. testudinum* at two additional sites produced results comparable to those above within 3 days. Resources provided by epiphytic algae to seagrass meiofauna (additional food, habitat, and/or shelter from predation) may be associated with algal morphology.

209. Hamilton, K. G. A. 1983. "Revision of the Macropsini and Neopsini of the new-world Rhynchota Homoptera Cicadellidae

with notes on inter sex morphology." Memoirs of the Entomological Society of Canada 123:1-224
The Neopsini encompasses 2 genera, both exclusively Neotropical: *Neopsis Oman* (5 spp. and *Nollia* gen. nov. (2 spp.). *Neopsis amazonica* sp. nov., *N. tumidifrons* sp. nov., *N. magna* sp. nov. (Brazil), *Nollia pallida* (Linnavuori and DeLong, 1977) comb. nov. (*Neopsis pallidus*) (type-species) and *Nollia rustica* sp. nov. (Chile) are described. The genera and species of the Neopsini are keyed. The New-World Macropsini encompasses 5 genera: *Pediopsis* Burmeister (1 sp.), *Pediopsoides* Matsumura (2 spp.), *Reticopsis* Hamilton (2 spp.), *Macropsis* Lewis (55 spp.) and *Oncopsis* Burmeister (36 spp.). Biological and morphological data are usd to define the species in this taxonomically difficult tribe, with the result that 45 new species are described: *M. acapulco, M. dimorpha, M. igniscutellata, M. mexicana, M. oncopsimilis and M. zebra* from Mexico; *M. aureocephala, M. californiensis, M. ferrax, M. inversalis, M. palustris, M. pulchra, O. arizona, O. aureostria* and *R. udrobates* from southern California and Arizona [USA]; *O. insignifica, O. mica* and *O. tangenta* from Utah; *M. borealis, M. rufescens, O. albicollis, O. incidens O. interior, O. juno, O. marilynae, O. monticola* and *O. tenuifoliae* from northwestern North America; *M. dixiensis* and *O. infumata* from southeastern North America; *M. decisa, M. jocosa, M. microceps, M. tunicata, M. xena, O. citrella, O. concurrens, O. dentata, O. deluda, O. prolixa, O. quebecensis* and *O. vartyi* from northeastern North America; and *M. deyiridis, O. citra, O. crispae* and *O. prairiana* from Canada. Five new subspecies are described: *O. cinctifrons kootenesis, O. prairiana ferrosus* and *O. p. occidentalis,* all from southern British Columbia; *O. nigrinasi* florida from Florida; and *M. deviridis alberta* from western Canada. Five new synonymies are created. Keys to all taxa, host associations and distribution maps are provided. The color phases of the various polymorphic species are analyzed. The morphology and significance of intersex individuals of Oncopsis spp. are described.

210. Hanisak, M. D., S. M. Blair, G. M. Burzycki, M. A. Samuel, and J. K. Reed. 1988. "The macroalgal community at Molasses Reef, Florida : Annual Meeting of the Phycological Society of America, Pacific Grove, CA (USA), 24-29 Jul 1988." Journal of Phycology 24 (Suppl.): 13
Quarterly sampling of the macroalgal community was conducted for two years at Molasses Reef in the Florida Keys. To date, over 200 algal taxa have been identified. Diversity was highest in hard coral areas where spatial complexity was maximal. Experimental manipulations demonstrated the developmental sequence of the algal community. Following a rapid colonization by microalgae and bacteria, new substrate is colonized by weedy chlorophytes (Trichosolen, Cladophora, and Enteromorpha). This initial assemblage is replaced by a

red algal turf dominated by *Gelidiella* spp., *Lophosiphonia cristata*, and *Polysiphonia* spp. These perennials are heavily grazed by herbivorous fish. In unimpacted areas, larger algae (*Dictyota, Halimeda*) occur. This study will provide baseline data for monitoring long-term changes in the reef community at this ecologically sensitive site.

211. Hanisak, M. D., S. M. Blair, G. M. Burzycki, M. A. Samuel, J. K. Reed, and W. E. Wood. 1989. "Algal community structure at Molasses Reef, Florida : Annual Meeting of the Phycological Society of America, Toronto, Ont., 6-10 Aug 1989." Journal of Phycology 25(2)(Suppl.): 14.

212. Hansen, B. F., and R. P. Wunderlin. 1988. "Synopsis of Dichanthelium Poaceae in Florida USA." Annals of the Missouri Botanical Garden 75 (4): 1637-1657
Twenty-five taxa of Dichanthelium are recognized for Florida, with synonymy and typification compiled. Keys to species and varieties and an index to names is provided. The new combinations *D. ensifolium* var. *breve,* (A. Hitchcock and Chase, 1910) [Panicum breve] *D. ensifolium* var. *unciphyllum,* (Trinius, 1826) [*Panicum unciphyllum*] and *D. portoricense* (Desvaux ex Hamilton) [*Panicum portoricense]* are proposed.

213. Harper, G. W., V. N. DeCario, and P. L. Croswell. 1988. "Monroe County, Florida : a joint agency GIS." In: URISA '88--Mapping the Future : the 26th Annual Conference of the Regional Information Systems Association.
Monroe County, Florida has entered into a joint agency agreement that binds the Planning Department, the property appraiser, the Florida Keys Aqueduct Authority (water utility), and the City Electric System (power utility) in a unique project to jointly own and operate a geographic information system. The system uses T1 communications lines at 1.544 Mbps to drive each of three remote graphics systems as though they were direct connected to the CPU. This paper discusses the joint agency organization, the system configuration, the software, communications, the benefits of shared data and data security.

214. Harrison, R. S., and M. Coniglio. 1985. "Origin of the Pleistocene Key Largo limestone, Florida Keys,." Bulletin of Canadian Petroleum Geology 33 (3): 350-358
The exposed bedrock of the Florida Keys consists of two contemporaneous Late Pleistocene marine formations; the Miami Limestone, predominantly oolitic in composition, and the Key Largo Limestone, an assemblage of coral reefs and carbonate sand. A variety of original depositional environments have been proposed for the latter formation, with interpretation and debate fuelled by the apparent

absence of a precise modern analogue. Assessment of the available data, however, places significant constraints on the interpretive options, and indicates that the Key Largo Formation represents a shallow-water complex of "shelf-margin" reefs and sand localized along a topographic break in slope. The conspicuous absence of the reef-building coral *Acropora palmata,* common to so many Holocene and other Pleistocene reefs, can be reasonably attributed to environmental stress and does not require that the Key Largo Limestone deposits represent patch reefs that accumulated behind a hypothetical, more seaward barrier reef.

215. Harrison, R. S., M. Coniglio, and R. B. Halley. 1982. "Late Pleistocene deposits of Florida Keys, USA : 1982 AAPG Annual Convention with divisions: SEPM/EMD/DPA, Calgary, Alberta, Canada, June 27-30, 1982." AAPG Bulletin 66 (5): 578-579

216. Harvey, D. J., and J. Longino. 1989. "Myrmecophily and larval food plants of *Brephidium isophthalma* Pseudofea Lycaenidae in the Florida Keys, USA." Journal of the Lepidopterists' Society 43 (4): 332-333

217. Hattin, D. E. 1973. "Possible living analog of the Pleistocene Key Largo reefs of Florida." Geological Society of America. Bulletin 84 (12): 3995-4000

218. Hattin, D. E. "Holocene cementation of carbonate sediments in Florida Keys." Geological and Mineralogical Joint Annual Meeting, Waterloo, Canada, 15-17 May 75.

219. Hazlett, B. A. 1972. "Responses to agonistic postures by the spider crab *Microphrys bicornutus.*" Marine Behaviour and Physiology 1 (1): 85-92

220. Hazlett, B. A. 1974. "Field observations on interspecific agonistic behavior in hermit crabs." Crustaceana 26 (2): 133-138

221. Hazlett, B. A. 1975. "Orientation to shell movement by *Clibanarius tricolor* (Gibbes) (Decapoda, Anomura, Diogenidae)." Crustaceana 28 (3): 271-274

222. Hazlett, B. A. 1976. "Effects of interspecific competition on fitness of the hermit crab *Clibanarius tricolor.*" Ecology 57(3): 579-586

223. Hazlett, B. A. 1979. "Biotic aspects of the distribution of the crabs *Panopeus herbstii* and *Mithrax sculptus.*" Bulletin of Marine Science 29 (4):576-580
Field surveys in northern Florida, the Florida Keys, and Jamaica revealed several patterns of intra- and interspecific interactions among the common brachyuran crabs

found under rocks and anemones (*Condylactis gigantea*). *P. herbstii* and *Menippe mercenaria* did not co-occur under the same rocks, and the males of *P. herbstii* found with females were larger than males without females. *M. sculptus* did not co-occur with *M. commensalis* on anemones in Jamaica, but the distributions of *M. sculptus* and *Microphryus bicornutus* under rocks in the Florida Keys were independent. For both species in the Keys, males with females were not larger than males without females.

224. Hazlett, B. A., C. Bach, and C. Mitchell. 1977. "Distributional patterns of the xanthid crab *Cataleptodius floridanus* (Gibbes, 1850) (Decapoda Brachyura, Xanthidae)." Crustaceana 33 (3): 316-319

225. Heard, R. W. 1986. "Pontoniine shrimps Decapoda Caridea Palaemonidae of the northwest Atlantic. I, The genus *Neopontonides* with the description of *Neopontonides chacei* n. sp. and the erection of *Pseudopontonides* n. gen. to receive *Neopontonides principis*." Journal of Crustacean Biology 6 (3): 471-484
Based on examination of specimens from the Florida Keys [USA] and from museum collections, the described species of the genus *Neopontonides Holthuis* are briefly reviewed and *N. chacei*, new species, is described from shallow waters of the Caribbean area. *Neopontonides chacei* has symmetrical second pereiopods, which distinguish it from the other described species of the genus. It is a symbiont of the gorgonian *Pseudopterogorgia americana*. Two hippolytid shrimps, *Hippolyte nicholsoni* Chace and Tozeuma sp., also were found associated with *P. americana*. The association of the Pacific species *N. dentiger* Holthuis with a gorgonian host is confirmed and *Leptogorgia setacea* is reported as a gorgonian host for *N. beaufortensis* Borradaile. Illustrations and a key for separating *N. beaufortensis, N. chacei,* and *N. dentiger* are presented. Based on the absence of an exopodal flagellum on maxilliped 1, distinctive differences in armature of antenna 2, and other morphological and ecological criteria, *N. principis* Criales cannot be accommodated by *Neopontonides* and a new genus *Pseudopontonides* is erected to receive it. The new genus appears to be most closely related to Pontonides Borradaile. The taxonomic status of *Pontonides and Pseudopontonides* is briefly discussed. An artificial key to these two genera and their species, and to other related genera that lack exopodal flagella on their first maxillipeds, is presented.

226. Heard, R. W., and D. G. Perlmutter. 1977. "Description of *Colomastix janiceae* n. sp., a commensal amphipod (Gammaridea: Colomastigidae) from the Florida Keys, USA." Proceedings of the Biological Society of Washington 90 (1): 30-42
C. janiceae sp. nov. found in sponges, *Spheciospongia*

vesparia at Molasses Keys (Florida Keys) and also at Key West and Dry Tortugas, Florida was described and compared with other species in body length, inner plate of the maxilliped, margin of the telson, outer ramus, development of the gnathopod and backward extension of the dactyl of males.

227. Heatwole, D. W., J. H. Hunt, and F. S. Kennedy, Jr. 1988. "Catch efficiencies of live lobster decoys and other attractants in the Florida, USA, spiny lobster fishery." Florida Marine Research Publications 44:1-15
Catch rates of spiny lobster, *Panulirus argus*, by traps individually baited and six natural or artificially produced baits were compared from 1566 trap pulls in the Florida Keys. Traps baited with live sublegal-sized lobsters (decoys) caught three times as many lobsters as did non-lobster-baited traps. Traps baited with cowhide, fish heads, cat food, liquified mullet, and a commercial bait made from herring caught fewer lobsters per unit effort than did unbaited traps; however, the differences were not significant. Catch per unit effort did not differ significantly between the Atlantic Ocean and Florida Bay for any bait. Traps containing decoys significantly reduced catch rates of adjacent (30-50 m distant) non-decoy traps, suggesting that spiny lobsters in traps facilitate aggregation of conspecifics by emitting a non-visual (acoustic or chemical) attractant. We conclude that the powerful attraction of confined lobsters cannot be matched by food attractants at the present level of fishing effort. Catches of stone crabs (*Menippe mercenaria*) and trunkfish (*Lactophrys* spp.) were inversely related to lobster catch. Evidence indicates that *P. argus* avoids traps containing stone crabs, whereas trunkfish avoid traps occupied by lobsters or other large crustaceans. Thus, lobster catch efficiency is reduced by baits that attract stone crabs but not by those which lure trunkfish. Lobster catch was not affected by capture of spider crabs, grunts, or sea urchins. Catches of octopi and triggerfish were too sparse to permit analyses of their effects on lobster yield.

228. Hebert, P. J., and Glenn Taylor. 1979. "Everything you always wanted to know about hurricanes. Pt. 2." Weatherwise 32 (3): 100-107
This is the second part of a two-part series discussing hurricanes during the 20th century. In Part 1, the 129 direct hits by hurricanes to Gulf and Atlantic coast states are analyzed. The Galveston Hurricane of 1900 is the deadliest hurricane on record, accounting for over 6000 deaths. The most intense hurricane to strike the U.S. occurred in 1935, when a storm reading 26.35 barometric in. hit the Florida Keys. The costliest storm to date is hurricane ''Agnes,'' which caused over $ 2,100,000,000 worth

of damage to Florida and the northeastern U.S.

229. Heinrich, G. H. 1977. "Ichneumoninae of Florida, USA, and neighboring states Hymenoptera Ichneumonidae subfamily Ichneumoninae." Arthropods of Florida and Neighboring Land Areas 9:1-350
A comprehensive treatment is presented of the Ichneumoninae of the southeastern states [USA]. General considerations include zoogeographical and distributional notes, biological notes, sexual dimorphism, dichromatism and terminology. Extensive keys are provided. New taxa are: *Protichneumon grandis inornatior* ssp. nov., *P. victoriae* Heinrich stat. nov. [from *P. grandis victoriae*], *P. glabricoxalis* sp. nov., *Coelichneumon navus albidior* ssp. nov., *C. lisae* sp. nov., *C. pseudowalleyi* sp. nov., *C. delirops* sp. nov., *Ichneumon fuscifrons torreyae* ssp. nov., *Orgichneumon calcatorius albidior* spp. nov., *Hemihoplis propitius* Cresson comb. nov. (ex I. *propitius*), *Setanta compta marginata* comb. nov. (ex *Amblyteles marginatus* Provancher, 1882), *Spilichneumon provancheri provancheri* Cushman comb. nov. (ex I. *bifasciatus* Provancher), *Spilichneumon provancheri flavidior* ssp. nov., *Neodiphyus* gen. nov. (type species *Ichneumon flavovarius* Cresson), *Cratichneumon variegatus fuscovariegator* ssp. nov., *C. w-album fuscior* Heinrich stat. nov. [from *C. fuscior* Heinrich], *C. louisianae* sp. nov., *C. excors* sp. nov., *C. facetus astroriparius* ssp. nov., *C. volens borealis* ssp. nov., *Barichneumon sphageti crassipunctatus* Heinrich stat. nov., *Stenobarichneumon agitatorops* sp. nov., *Virgichneumon* gen. nov. (type species *I. zebratus* Cresson), *V. zebratus zebratus* (Cresson) comb. nov. (ex *I. zebratus* Cresson), *V. zebratus robsonicus* ssp. nov., *V. seticornutus* Heinrich comb. nov. (ex *B. seticornutus* Heinrich, 1971), *V. texanus* (Cresson) comb. nov., *V. albomarginatus* (Cresson) comb. nov. (ex *I. albomarginatus*, Townes and Townes), *Melanichneumon complicatus* sp. nov., *Rictichneumon* Heinrich stat. nov. (type species *Ichneumon residuus* Say), *R. belfragei* (Cresson) comb. nov., (ex *I. belfragei* Cresson), *Aoplus confirmatus insignitior* ssp. nov., *Paraditremops* gen. nov. (type species *I. albipectus*), *Platylabus flavidoclarus* sp. nov., *Neolinycus michaelis arkansae* ssp. nov., *Trogus pennator argutus* ssp. nov, *Phaeogenes herbrus floridae* ssp. nov., *P. trianguliferens* sp. nov., *P. brevior* sp. nov., *Dicaelotus auranticolor* sp. nov. and *D. coriaceus* sp. nov. Color plates, literature, host index and name index are addended.

230. Heppner, J. B. 1988. "A new species of Ethmia from the Florida Keys, USA, Oecophoridae Ethmiinae." Journal of the Lepidopterists' Society 42 (4): 281-284
Ethmia powelli is described from Upper Matecumbe Key based on 123 specimens. It is related to *E. humilis* Powell and *E. julia* Powell, in the confusella species-group, by genitalic

characters, and is distinguished from *E. farrella* Powell by the small wingspan and fewer forewing black spots.

231. Herrnkind, W. F., M. J. Butler, IV, and R. A. Tankersley. 1988. "The effects of siltation on recruitment of spiny lobsters *Panulirus argus*." U.S. National Marine Fisheries Service. Fisheries Bulletin 86 (2): 331-338
Several surveys in the Florida Keys indicated fewer juvenile spiny lobsters, *Panulirus argus*, in an area where their primary habitat, stands of benthic algae *Laurencia* spp., was heavily silted as compared with similar, less silted habitat. We tested several hypotheses explaining this relationship: 1) planktonic postlarval lobster abundances are lower in the silted area, 2) siltation of algae impedes postlarval settlement or subsequent juvenile habitat selection, or 3) siltation increases mortality at the time of metamorphosis. We also compared the time-to-metamorphosis for settling pueruli within silted and nonsilted algae, analyzed the physical character of algal silt in low-silt and high-silt regions and measured the abundances of epifauna constituting prey of juvenile spiny lobsters. Planktonic postlarval abundances were substantially higher in the high-silt area thus rejecting hypothesis 1. Likewise, results from laboratory experiments testing the effect of algal siltation on postlarval time-to-metamorphosis and early postsettlement survival showed no short-term increase in mortality. Limited postlarval settlement and avoidance of silted algal habitats by juveniles, as determined in substrate choice experiments, probably accounts for the paucity of young spiny lobsters in heavily silted localities. In addition, although juvenile spiny lobsters are nonselective predators, lower prey availability in silted algae probably promotes transiency which, in turn, causes increased mortality by predation while juveniles are exposed. Large-scale siltation exacerbated by human activity must be viewed as potentially deleterious to spiny lobster recruitment.

232. Hess, S. C. 1978. Guide to the commoner shallow-water asteroids (starfish) of Florida, the Gulf of Mexico, and the Caribbean region. Coral Gables, Fla.: University of Miami, Sea Grant Program. Sea Grant Field Guide Series.
There are ~180 species of starfish known from Florida, the Gulf of Mexico, and the Caribbean of which ~20 species inhabit waters <50 m deep. The 11 species identified represent the species most frequently encountered by snorkeling, scuba, wading, and beach collecting. Starfish are very destructive to shellfish and the only commercial uses for them have been as fertilizers, supplements to poultry feed, and as natural history curios and souvenirs. A key to identification and photographs of each species are provided. Morphology and reproduction are discussed.

Recognition features, size, comparisons, geographic range, habitat and depth range, spawning, and other names are given for each species.

233. Hicks, D. B., T. R. Cavinder, B. S. Carroll, R. L. Raschke, and P. M. Murphy. 1975. Finger-Fill Canal Studies, Florida and North Carolina. Springfield, VA: Available from the National Technical Information Service.
Four areas in Florida (Punta Gorda, Big Pine Key, Marathon, and Panama City, and one in southeastern North Carolina (Atlantic Beach) were assessed for water quality effects of finger-fill canal developments. Coastal wetlands in the southeastern U.S., which are ecologically valuable transition zones between uplands and estuaries, are currently being developed for artificial water front real estate by dredging canals via two methods: (1) in the Carolinas and northern Gulf coastal area an access channel is often excavated through the wetlands, from which branches a perimeter canal along the marsh upland ecosystem, or a series of canals through the uplands; (2) in the Florida peninsula and keys, canals are generally excavated within the wetlands, with the spoil used to cover adjoining wetlands in order to raise elevation for residential development. Both methods adversely affect both wetlands and water quality; the second method not only permanently eliminates the wetland ecosystem, but creates a new system that usually negatively affects maintenance of a quality ecosystem. Based on extensive water quality, flushing rate, and nutrient exchange data, it is recommended that (1) coastal canal developments be restricted to nonwetland areas; (2) effects on shallow aquifers be assessed during planning; (3) canal depths should not exceed 4-6 ft below mean low water; and (4) no sewage effluents be discharged directly into finger-fill canal waters.

234. Hobbs, H. H., III. 1970. "New entocytherid ostracods of the genus *Ornithocythere* and the description of a new genus." Proceedings of the Biological Society of Washington 83 (15): 171-182

235. Hobbs, H. H., Jr., H. H. Hobbs, III, and M. A. Daniel. 1977. A review of the troglobitic decapod crustaceans of the Americas. Washington, D.C.: Smithsonian Institution Press. Smithsonian Contributions to Zoology, 244.
Eight families comprising 18 genera and 55 spp. and subspecies of troglobitic and anchialine decapod crustaceans are recorded from the Americas. The family Atyidae is represented by 2 genera: *Palaemonias,* with 2 spp. occurring in the USA, and *Typhlatya,* encompassing 7 spp. found in the West Indies, Yucatan and the Galapagos Islands. Among the 6 genera of the family Palaemonidae are the Mexican monotypic *Bithynops* in Chiapas, *Creaseria* in Yucatan and Neopalaemon

in Oaxaca; in addition, 1 sp. of the genus *Macrobrachium* occur in Oaxaca, 2 spp. of the genus *Palaemonetes* frequent subterranean habitats in the USA, and 6 members of the genus *Troglocubanus* occur in Cuba, Jamaica and San Luis Potosi, Mexico. Only 1 troglobitic species of the genus *Alpheopsis,* a member of the largely marine family Alpheidae, occurs in the area, that in Oaxaca, Mexico. Two genera of the also primarily marine family Hippolytidae, *Barbouria* and *Calliasmata,* are each represented by a single species occurring in anchialine habitats in the West Indies, the latter only in the Dominican Republic. Of the 3 endemic American groups, the Cambarinae comprises the largest number of troglobites: there are 8 spp. of *Cambarus,* 6 spp. and subspecies of *Orconectes,* and 13 spp. and subspecies of *Procambarus;* the former 2 are confined to USA and the latter is present also in Cuba and Mexico; the monotypic *Troglocambarus* is restricted to peninsular Florida. The other 2 endemic groups, the families Aeglidae and Pseudothelphusidae, are represented, respectively, by a single species of the genus *Aegla* [*A. cavernicola*] occurring in Brazil and 1 of *Potamocarcinus* [*P. mocinoi*] in Chiapas, Mexico. The remaining widespread family Grapsidae encompasses a member of the genus *Sesarma* [*S. verley*] in Jamaica. Following a presentation of the composition of the fauna and a historical account of investigations leading to present knowledge of it is a discussion of the evolution of the several groups and a key to aid in the identification of members of the fauna. The systematic section includes synonymies for the genera, subgenera, species and subspecies. Each of the supraspecific taxa is diagnosed, its range defined and the numbers of species and troglobitic or anchialine representatives noted. For each species and subspecies, as complete a synonymy as was possible to obtain is provided. Also a diagnosis, the maximum size, disposition of the types, type-locality, and range (including locality records) are followed by a summary of available ecological and life-history data; illustrations are provided for each. Appended to this study is a list of the non-troglobitic decapods that are known to occur in subterranean habitats, a glossary of terms employed in the text, and a list of the symbionts of American troglobitic decapods.

236. Hodges, L. T., and Ariel A. Roth. 1986. "Orientation of corals and stromatoporoids in some Pleistocene, Devonian, and Silurian reef facies (L'orientation des coraux et stromatoporoides dans quelques faces recifaux du Pleistocene, Devonien et Silurien)." Journal of Paleontology 60(6):1147-1158

237. Hoese, H. D., and R. H. Moore. 1977. Fishes of the Gulf of Mexico, Texas, Louisiana, and adjacent waters. College Station, Tex.: Texas A&M University Press.
This guide to all temperate and subtropical fish of the

entire gulf and to tropical species likely to be found in the northern gulf over the continental shelf is divided into 3 sections. Color plates, keys to fish families, and descriptions of each family and species are presented. Deepwater and slope species are not described, but are listed along with freshwater fish that commonly venture into brackish or salt water and saltwater fish that may be occasionally found in inland fresh waters. Freshwater fish that are resident in low-salinity waters are also included.

238. Holland, R. 1985. "Coral reef research and the Wellwood incident." Sea Frontiers 31 (1): 28-35.

239. Holm, R. F. 1977. "The standing crop of fishes in a tropical marine lagoon." Florida Scientist 40 (3): 258-261
The ichthyofauna of a tropical marine lagoon in the upper Florida Keys [USA] was censused in early spring and mid-summer in 1973. Visual counts revealed a fish standing crop of 0.01 kg/m^2 (wet wt) in 1973. Carnivores represented the greatest percentage of the total standing crop of fish by wt. The visual censusing method employed may underestimate herbivore standing crop in tropical marine lagoons.

240. Holm, R. F. 1978. "The community structure of a tropical marine lagoon." Estuarine and Coastal Marine Science 7 (4): 329-345
The structure of the benthic community in a nearshore tropical marine lagoon, in the upper Florida Keys, was examined in early spring and midsummer in 1973 and 1974. Eight environmental parameters (water depth, tidal range, current flow, water temperature, salinity, pH, sediment depth, and particle size) were monitored. The biota was compared along an intertidal-subtidal environmental gradient. The amount of vegetation present and the stability of the sediment modified the abundance and diversity of the benthic macrofauna. The results of this study were compared with those from other areas in the tropical Western Atlantic Ocean. The uniqueness of the lagunar environment made it possible to examine the changes in species abundance and diversity as a detritus-based food web graded into a phytoplankton based-food web.

241. Holmquist, J. G., G. V. N. Powell, and S. M. Sogard. 1989. "Decapod and stomatopod assemblages on a system of seagrass-covered mud banks in Florida Bay." Marine Biology 100 (4): 473-484
The latticework of seagrass-covered mud banks in Florida Bay, Florida Keys, USA, divides the bay into distinct subenvironments and supports a robust seagrass community subject to pronounced physical stress. Throw-trap sampling of decapods and stomatopods showed that bank sides exposed to turbulence had low abundance but similar species richness

to that of bank tops and sheltered sides. The fauna was more Gulf-Carolinean than Antillean. The crustacean communities of the different subenvironments were distinct. The two subenvironments adjacent to the Atlantic Ocean and Gulf of Mexico had the greatest densities.

242. Hopper, B. E. 1972. "Free living marine nematodes from Biscayne Bay, Florida. Part 4, Cyatholaimidae on the occurrence of *Marilynia* n. gen. and *Longicyatholaimus* in Biscayne Bay with a description of *Longicyatholaimus longicaudatus* from the type locality." Zoologischer Anzeiger 189 (1-2): 64-88

243. Hovis, J. A., and M. S. Robson. 1989. "Breeding status and distribution of the least tern in the Florida Keys, USA." Florida Field Naturalist 17 (3): 61-66

244. Howard, J. F., D. L. Kissling, and J. A. Lineback. 1970. "Sedimentary facies and distribution of biota in Coupon Bight, Lower Florida Keys." Geological Society of America. Bulletin 81 (7): 1929-1945

245. Howe, M. A., R. C. Laybourne, and F. C. James. 1977. "Morphological variation in breeding red-winged blackbirds *Agelaius phoeniceus* in Florida, USA." Florida Scientist 40 (3): 273-280
Adult male (285) and adult female (298) red-winged blackbirds *A. phoeniceus* from localities throughout Florida [USA] were collected during the breeding season. Specimens were prepared and examined to determine the nature and extent of geographic variation in morphological characters. Mean wing length, tail length and weight decrease clinally from northwest to southeast, except that birds from the Keys are larger than birds from the Everglades. Other morphological characters similarly but to a lesser degree. Color of streaking in females is darkest in the northwest and lightest in the southeast. With the possible exception of the Everglades population, recognition of more than 1 ssp. of the red-winged blackbird in Florida is not warranted.

246. Huber, J. T. 1988. "The species groups of *Gonatocerus* Nees in North America with a revision of the Sulphuripes and Ater groups Hymenoptera Mymaridae." Memoirs of the Entomological Society of Canada 141:1-109
A provisional cladistic analysis of the species groups of *Gonatocerus* Nees is presented, based on 24 characters. Six species groups are defined, but only the four Nearctic ones are described. The species groups proposed are the *Ater, Deficiens, Litoralis, Membraciphagus, Straeleni,* and *Sulphuripes* groups. The *Ater* group is divided into the *Morrilli, Ater* (s.s.), and *Bucculentus* subgroups. Keys are provided to distinguish the species groups, and females of

the *Sulphuripes*- and *Ater*-group species. Twenty-four species are recognized in the *Sulphuripes* and *Ater* groups for America north of Mexico. Eight species are recognized in the *Sulphuripes* group, of which *californicus, koebelei, maga, mexicanus, rivalis,* and *utahensis* are redescribed. Two species, *floridensis* [Florida, USA] and *lissonotus* [Canada], are described as new. One new synonymy is proposed: *titillatus* is considered a junior synonym of *utahensis.* Sixteen species are recognized in the *Ater* group, of which *ashmeadi, capitatus, dolichocerus, fasciatus, latipennis, morrilli, novifasciatus, ovicenatus,* and *triguttatus* are redescribed. Seven species, *bucculentus,* [Arizona], *enicmophilus* [California] *flagellatus* [Texus], *impar, incomptus* [California], *inexpectatus* [Canada], and *inflatiscapus* [California] are described as new. Two new synonymies are proposed: *maximus* is considered a junior synonym of *latipennis,* and *marilandicus* a junior synonym of *dolichocerus.* Lectotypes are designated for *ashemadi, capitatus, koebelei, mexicanus, morrilli, ovicenatus, trigutatus, and utahensis.*

247. Hubricht, L. 1981. "The endangered land snails of the eastern USA : 47th Annual Meeting of the American Malacological Union, Inc., Ft. Lauderdale, Fla., USA, July 19-25, 1981." Bulletin of the American Malacological Union 50:53-54

248. Hudson, J. H. 1970. A sled-mounted suction sampler for benthic organisms. Washington, D.C.: U.S. Fish and Wildlife Service. Special scientific report-fisheries, no. 614.

249. Hudson, J. H. 1981. "Growth rates in *Montastrea annularis* : a record of environmental change in Key Largo Coral Reef Marine Sanctuary, Florida, USA." Bulletin of Marine Science 31 (2): 444-459
Annual growth rates of *M. annularis* over the last 50+ yr were determined for inshore, midshore and offshore reef areas within the Key Largo Coral Reef Marine Sanctuary, Florida. In this study, 144 massive heads of *M. annularis* were sampled by coring and their growth history examined using X-radiography to facilitate accurate measurement of > 7000 individual annual growth increments. Key elements affecting growth and survival of *M. annularis* in the sanctuary appear to be water depth, turbidity and temperature. *M. annularis* from offshore fore-reef areas grew most slowly, averaging only 6.3 mm of vertical growth per year from 1928-1978. Many cores at this location reveal a long history of environmental stress indicated by numerous healed-over die-off voids excavated by various boring organisms, principally boring sponges. Abnormal density layers (stress bands) are common. *M. annularis* from 3 reef areas nearest shore revealed a similar record of environmental stress but grew

slightly faster at an average rate of 8.2 mm/yr. Stress banding and bioerosion voids are common in all cores from this area as well. Growth rates of *M. annularis* were highest in midshore reef areas, averaging 11.2 mm/yr at 3 of 5 sites. Stress banding was minimal in most cases, as were incidences of massive skeletal damage by bioerosion. Environmetnal implications, though circumstantial, are provocative in that the recent decline in coral growth (1953-1968) at some midshore and inshore reefs coincides with increased dredge and fill operations in the Florida Keys area. A slight overall resurgence in coral growth on these same reefs (1973-present) coincides with a ban on these operations.

250. Hudson, J. H. 1984. "Seasonal growth-rates and carbonate production in *Halimeda opuntia* at Marquesas Keys, Florida." AAPG Bulletin 68 (4): 489

251. Hudson, J. H., E. D. Gomez, C. E. Birkeland, R. W. Buddemeier, R. E. Johannes, J. A., Marsh, Jr., and R. T., Tsuda. 1981. "Response of *Montastrea annularis* to environmental change in the Florida Keys." In : The reef and man : proceedings of the fourth International Coral Reef Symposium. Volume 2.
Effects of environment on growth and health of five *Montastrea annularis* head corals transplanted along an inshore-offshore transect on the Florida reef tract were monitored from July, 1976 to December, 1980. Growth rates of transplanted corals were determined by X-radiograph analysis of small core samples during the experiment and at its termination. Growth, stress, and mortality of transplanted corals were correlated with continuous hourly bottom-water temperature data collected at three of the five sites over the period of study.

252. Hudson, J. H., G. V. N. Powell, M. B. Robblee, and T. J. Smith, III. 1989. "A 107-year-old coral from Florida Bay--Barometer of natural and man-induced catastrophes? : Symposium on Florida Bay--a Subtropical Lagoon, Everglades National Park and Miami, FL (USA); 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 283-291
The 107-year growth history of a massive coral *Solenastrea bournoni* from Florida Bay was reconstructed with x-ray imagery from a single-4-in.-diameter (10 cm) core that penetrated the exact epicenter of the 95.3-cm-high colony. Growth rate trends in the Florida Bay coral were compared to those in a *Montastraea annularis* of similar age from Hen and Chickens, a nearby patch reef on the Atlantic Ocean side of the Florida Keys. It was concluded that growth rate, at least in these specimens, is a questionable indicator of past hurricanes and freezes. There does appear to be, however, a possible cause-and-effect relationship between

major man-induced environmental perturbations and a prolonged reduction in growth rate in each coral's growth record.

253. Huffman, D. G., and W. L. Bullock. 1972. "*Capillaria cyprinodonticola* n. sp. (*Nemotoda Trichinellida*) from the livers of cyprinodontiform fishes of the Florida Keys." Journal of Parasitology 59 (2): 260-263

254. Hughes, G. H., E. R. Hampton, and D. F. Tucker. 1971. Annual and seasonal rainfall in Florida. Tallahassee, Fla. : Florida Dept. of Natural Resources, Bureau of Geology. Florida Bureau of Geology Map Series, no. 40.
A one-sheet hydrologic atlas contains 8 illustrations describing annual and seasonal rainfall in Florida. The map of mean annual rainfall shows that rainfall varies from about 40 inches in the Florida Keys to more than 64 inches in southeast and northwest Florida, and is greater than 50 inches over most of the state. The distribution of mean seasonal rainfall in Florida is shown by maps for different seasons of the year. THe variation of annual rainfall is even greater than the areal variations of mean seasonal and mean annual rainfall. The annual, summer, and winter rainfall at Pensacola, Gainesville, and Everglades during 1930-65 are shown by the bar graphs.

255. Hughes, P. 1979. "Great Galveston hurricane." Weatherwise 32 (4): 148-156
The 1900 Galveston hurricane was a far greater disaster than the Chicago fire of 1871, which killed 250 people; the 1906 San Francisco earthquake, which killed 480; or the Johnstown flood in 1889, which claimed 2200 lives. In the city of Galveston alone, the hurricane killed at least 6000 people and left 5000 injured. At least 2000 more died elsewhere. The hurricane was born about 4000 mi away from the city, west of the Cape Verde Islands on Aug. 27. On Sept. 5, when the storm struck the Florida Keys, it became a full-blown hurricane. Winds were estimated to be 120 m.p.h. or more. Twelve hurricanes have struck the U.S. since the one that struck Galveston in 1900; one was almost equal in severity and two were more intense-the hurricane that struck the Florida Keys in 1935 and hurricane ''Camille,'' which hit the Gulf Coast in 1969.

256. Hunt, J. H. 1987. "Status of queen conch *Strombus gigas* management in the Florida Keys, USA." In: Proceedings of the Gulf and Caribbean Fisheries Institute, 38, Trois-Islets, Martinique, November, 1985. Miami, Fla.:
Gulf and Caribbean Fisheries Institute.

257. Hunt, J. H., and W. G. Lyons. 1986. "Factors affecting growth and maturation of spiny lobsters, *Panulirus argus*, in

the Florida Keys." Canadian Journal of Fisheries and Aquatic Sciences 43 (11): 2243-2247

258. Ingham, R. E., and J. A. Zischke. 1977. "Prey preferences of carnivorous inter tidal snails in the Florida Keys, USA." Veliger 20 (1): 49-51
Prey selections by 6 spp. of carnivorous snails were observed on 2 separate strips of intertidal beachrock in the Florida Keys [USA]. The predators studied were: *Thais haemastoma floridana, T. deltoidea, T. rustica, Morula nodulosa, Pisania tincta* and *Leucozonia nassa*. On Pigeon Key the most abundant prey, the vermetid snail *Spiroglyphus annulatus*, made up 83.9% (*Pisania tincta*) to 99.8% (*Morula nodulosa*) of the diets of predators. The other species of prey: the tree oysters *Isognomon bicolor* and *I. radiatus*, the mussel *Brachidontes exustus* and the barnacle *Tetraclita squamosa* separately constituted no more than 8.1% of the diet of any predator. On Key Vaca (where no *Spiroglyphus* were found) thaids were the only predators and the commonest prey of the 3 *Thais* spp. combined was *Tetraclita* (46%) followed by *Isognomon* (37.2%) and *Brachidontes* (14.7%). The predators feed primarily on vermetid snails, when available, but in the absence of vermetids they feed on barnacles, tree oysters and mussels in direct relation to the relative abundance of the prey species.

259. Iverson, J. B. 1978. "Variation in striped mud turtles *Kinosternon baurii Reptilia Testudines* Kinosternidae." Journal of Herpetology 12 (2): 135-142
Striped mud turtles, *K. baurii palmarum*, from the Gulf Hammock region of the Florida [USA] mainland exhibit color [head and carapace] patterns characteristic of Lower Florida Keys *K. b. baurii*. Although biogeographic and geologic evidence suggest former faunal interchange between the 2 areas, multivariate analyses of 23 mensural character ratios indicate very little morphometric similarity between the 2 populations. Characters that vary geographically over the species' range show clinal trends along a north-south peninsular axis. Analysis of these characters revealed a general clinal tendency for plastral reduction from north to south Florida, a phenomenon noted also in K. subrubrum. The presence of at least 1 other population on the mainland exhibiting pattern characters typical of Lower Keys' turtles, the great variability in color patterns observed throughout the species' range and the lack of morphometric distinctiveness of Lower Keys *K. baurii* do not justify present subspecific designations.

260. Jaap, W. C. 1975. Observations on Florida reef corals treated with fish-collecting chemicals. St. Petersburg, Fla. : Florida Dept. of Natural Resources. Florida marine research publications ; no. 10.

261. Jaap, W. C. 1979. "Observations on Zooxanthellae expulsion at Middle Sambo Reef, Florida Keys." Bulletin of Marine Science 29 (3): 414-422
Large-scale discoloration of Middle Sambo reef, 7.8 km from Boca Chica Key, Monroe County, Florida, was investigated. Discoloration of organisms was generally confined to the reef flat. The hydrozoan coral *Millepora complanata* displayed greatest discoloration. Some *Acropora palmata, Montastraea annularis,* and *Palythoa* sp. colonies were mildly discolored. Corals were still viable. Calm weather, high ambient temperatures, and low tides at midday probably caused water temperature elevation sufficient to produce thermal stress, thereby causing expulsion of the endosymbiotic dinoflagellate, *Gymnodinium microadriaticum,* with consequent discoloration of cnidarian hosts. Most organisms regained normal color within 6 wk. Reports of similar coral discoloration incidents are reviewed. Short periods of thermal stress probably had little lasting effect on shallow reef cnidarian communities.

262. Jaap, W. C. 1981. "Stony corals (*Milleporina* and *Scleractinia*)." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

263. Jaap, W. C. 1984. Ecology of the south Florida coral reefs : a community profile. Washington, D.C.: U.S. Dept. of the Interior, Fish and Wildlife Service, Minerals Management Service.
An overview of coral reef research in southern Florida is provided as a prelude to a genuine description of the coral reef ecosystem in the Florida Keys and surrounding environments. Coral reef community types, reef benthos, plankton and reef fish are given specific treatment. Coral reef ecology and management are described. 27 figs., 31 tabs.

264. Jaap, W. C., W. G. Lyons, P. Dustan, and J. C. Halas. 1989. Stony coral (*Scleractinia* and *Milleporina*) community structure at Bird Key Reef, Ft. Jefferson National Monument, Dry Tortugas, Florida. St. Petersburg, Fla. : Florida Dept. of Natural Resources. Florida marine research publications ; no. 46.

265. Jacobsen, T. "Distribution and status of alligators and crocodiles in the lower Florida Keys, USA." 46th Annual Meeting of the Florida Academy of Sciences, Deland, Fla., USA, April 22-24, 1982.

266. Jameson, S. C. 1981. "Archaelogy." In: Key Largo Coral Reef

National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

267. Jameson, S. C. 1981. "Biological zonation." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

268. Jameson, S. C. 1981. Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

269. Jensen, K. R. 1980. "*Oxynoe azuropunctata* n. sp., a new Sacoglossan from the Florida Keys (Mollusca, Opisthobranchia)." Journal of Molluscan Studies 46:282-292

270. Jindrich, V. 1969. "Recent carbonate sedimentation by tidal channels in the lower Florida Keys." Journal of Sedimentary Petrology 39 (2): 531-553

271. Johnson, C., and M. J. Westfall, Jr. 1970. "Diagnostic keys and notes on the damselflies Zygoptera of Florida." Bulletin. Florida State Museum. Biological Sciences 15 (2): 45-89

272. Johnson, R. L. 1989. "Live birth rates in two free-ranging rhesus breeding colonies in the Florida Keys, USA." Primates 30 (3): 433-437
The present paper provides an analysis of reproductive data derived from 1,265 adult female rhesus monkeys (*Macaca mulatta*), including 570 animals 13 years old and older. The data were collected during a partial census of two provisioned but free-ranging rhesus populations in the Florida Keys. Within both colonies, live birthrates were found to increase sharply among females 4-7 years old and to decline linearly among females 7-17 years of age. These data do not support the suggestion by ANDERSON (1986) that a decline in fertility among nonhuman primate females is primarily the result of deteriorating health rather than age per se.

273. Jones, R. and M. Clark. 1981. "Fishes." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

274. Josselyn, M. N. 1977. "Seasonal changes in the distribution and growth of *Laurencia poitei* Rhodophyceae Ceramiales in a subtropical lagoon." Aquatic Botany 3 (3): 217-230
Seasonal changes in the biomass and growth rates of *L. poitei* (Lamouroux) Howe (Rhodophyceae, Ceramiales) were studied in Card Sound, a shallow subtropical lagoon in the Florida Keys, USA. Quarterly surveys of the standing crop were made in conjunction with biweekly measurements of growth rates. The algal biomass increased fron late Sept. to April and then declined during the summer. The local distribution of *L. poitei* was largely dependent upon water circulation within the Sound. The growth rates at deep water stations averaged 2-5% weight increase/day during the late fall and spring, and 0-2% at other seasons. Maximum growth occurred between 23 and 26° C and at subsurface light intensities of 275-325 g cal/cm2 per day. The alga's annual production was estimated to be 21 g dry wt/m^2 per yr.

275. Jowett, E. C. "Detrital remanent magnetization of modern lime muds from Florida Keys." Internatinal Symposium of Geomagnetism and Aeronomy, 3rd General Assembly, Seattle, Washington, 22 Aug-3 Sep 77.

276. Kahle, C. F. 1977. "Origin of subaerial Holocene calcareous crusts role of algae fungi and sparmicritisation." Sedimentology 24 (3): 413-436
The Pleistocene Miami Limestone that crops out on the lower Florida Keys [USA] is overlain by thin (16 cm or less), discontinuous, Holocene calcareous crusts (caliche) that are usually laminated, composed dominantly of calcite micrite and may or may not incorporate part of the underlying limestone. Both allochems and sparry calcite cement in the former unit contain endolithic algae and fungi, borings and unicellular algae. Biogenic structures identical to those in the Miami Limestone also occur in the calcareous crusts but are somewhat less abundant in the latter unit versus the former unit. The calcareous crusts were formed in the vadose diagenetic environment. Some of the $CaCO^3$ necessary for the micrite that comprises the bulk of the crusts was probably derived from solution of carbonate from a soil cover and some from wind blown salt spray. Most of the micrite, however, was formed by replacement of the uppermost portions of the Miami Limestone. Replacement involved micritization of allochems and a previously unreported process, sparmicritization, the degrading recrystallization of sparry calcite to micrite. Minor sparmicritization was caused by micrite calcification of endolithic fungi or algae within sparry calcite cement or by micrite precipitation in empty borings within such cement. Most sparmicritization took place by dissolution of sparry calcite and concomitant precipitation of micrite in the space occupied previously by the dissolved spar. Such sparmicritization is interpreted to

be caused by chemical reactions involving the crystals, pore water which is moving slowly but steadily and organic compounds released during bacterial decomposition of fungi, algae or both. It is recognized that sparmicritization occurs in the marine diagenetic environment and is not, therefore, necessarily indicative of vadose diagenesis. Incomplete sparmicritization is responsible for some of the clotted textures typically found within calcareous crusts and may explain such textures in many other carbonate rock types. A combination of sparmicritization and micritization has probably greatly influenced the porosity of many reefs and in some cases, led to the formation of 'micritic reefs'.

277. Kahle, C. F. 1981. "Origin of ooids in Pleistocene Miami Limestone, Florida Keys (66th annual AAPG conference)." AAPG Bulletin 65 (5): 943

278. Kaiser, P. E., S. K. Narang, J. A. Seawright, and D. L. Kline. 1988. "A new member of the *Anopheles quadrimaculatus* complex species C." Journal of the American Mosquito Control Association 4 (4): 494-499
A new member, species C, of the *Anopheles quadrimaculatus* complex was recently found in collections from the northwest coast of Florida [USA]. This new species cannot be differentiated from the other 2 species with available taxonomic keys. Evidence for this taxon as a sibling species includes data on hybrid sterility and distorted sex ratios in the progeny of crosses to species A and B, chromosomal differences, and diagnostic allozymes.

279. Kelly, M. G. "Patterns of distribution of coastal biota, remote sensing, and conservation of resources." In: Symposium on Hydrobiology, 'Bioresources of Shallow Water Environments Environments', June 24-27, 1970, Miami Beach, Florida. pp. 105-113.
A better knowledge of normal coastal ecosystems is required in order to understand the effects of man's exploitation of coastal waters. Too little is known of the distribution of marine communities and water masses. Bottom material and material suspended in the water have been studied using aerial photography. Three sites photographed from heights of 12,000 feet and 60,000 feet were the west edge of the Bahama Banks, the Biscayne Bay and Florida Keys area, and the New York-Long Island area. Bottom sediment samples and water samples were examined. Bottom vegetation was clearly visible and there was little suspended material in the Florida Straits waters, whereas in the New York area bottom vegetation was visible only at very shallow depths and there was more suspended material. Several examples of the photographic are given and explained, though data analysis is still in progress. Satellite photographs of coastal areas are also examined. Distribution of suspended materials can be monitored, and patterns and types

of bottom vegetation can be analyzed. This type of photography should allow a much better understanding of coastal circulation and of the distribution and changes of biological communities. The biological and physical processes that produce the images still need further study.

280. Kennedy, M. L., and S. L. Lindsay. 1984. "Morphologic variation in the raccoon *Procyon lotor* and its relationship to genic and environmental variation." Journal of Mammalogy 65 (2): 195-205
Morphologic variation in the raccoon, *P. lotor,* from the southeastern USA was assessed with univariate and multivariate analyses. The species was found to be sexually dimorphic with skulls of males generally more massive. This may relate to intraspecific territorial defense rather than intersexual resource partitioning. A matrix of correlation among skull characters was computed and the first 3 principal components were extracted. These accounted for 84.2% of the variation in the character set among males and 86.5% among females. Three-dimensional projection of localities onto principal components showed that, for males and females, large individuals occurred in western and northern states and the smallest animals occurred in the Florida Keys. Size gradations were seen with most raccoons similar to those in nearby geographic areas. No relationship was detected between genic and morphologic variation; a relationship was found between patterns of morphologic and environmental variation. This relationship was stronger in males. Canonical correlation suggested that trends in size of raccoons follow Bergmann's rule, but other arguments are against this. It appears that patterns of variation in size in raccoons have developed under a complex array of environmental pressures which cannot be individually dissected. The raccoon genome, while relatively static, may allow for a high degree of morphologic plasticity in the face of environmental variation.

281. Kensley, B. 1983. New records of bresiliid shrimp from Australia, South africa, Caribbean, and Gulf of Mexico Decapoda Natantia Caridea. Washington, D.C.: Smithsonian Institution Press. Smithsonian Contributions to Zoology, 394.
New records and taxa of bresiliid shrimp are presented. The type-material of 6 spp. of *Discias* was examined and revised diagnoses provided. *D. mvitae* Bruce is synonymized with *D. exul* Kemp. *D. brownae* sp. nov. from New South Wales, Australia, is described and distinguished from *D. exul,* the species it most closely resembles. New records of *D. serratirostris* from the Gulf of Mexico, the Florida Keys [USA] and Belize are provided. Pseudocheles chacei sp. nov. from Florida and Belize is described as new and distinguished from the very similar *P. enigma* Chace and Brown from the Great Barrier Reef of Australia. *Tridiscias*

transkei gen. et sp. nov. is described from the continental shelf off the eastern coast of South Africa. The genus differs most significantly from Discias in possessing strong supraorbital spines and exopods only on the first 3 pairs of pereopods.

282. Kensley, B. 1987. "Harrieta new genus for *Cymodoce faxoni* Richardson Crustacea Isopoda Sphaeromatidae." Proceedings of the Biological Society of Washington 100 (4): 1036-1039
A new genus, Harrieta, is diagnosed for *Cymodoce faxoni* (Richardson), a common shallow-water isopod of the Florida Keys and the eastern Gulf of Mexico. The new genus is characterized by the possession of three pairs of oostegites with five pairs of internal pouches and metamorphosed mouthparts in the female, and by a uropodal exopod twice the length of the endopod in the male.

283. Kensley, B., and G. M. Simmons, Jr. 1988. "*Axiorygma nethertoni* new genus new species of thalassinidean shrimp from Florida, USA Decapoda Axiidae." Journal of Crustacean Biology 8 (4): 657-667
Axiorygma nethertoni is described from material collected in about 30 m of water off the Key Largo area of the Florida Keys, and from 52-58 m in the Gulf of Mexico off the west coast of Florida. The genus is characterized by the possession of sexually dimorphic chelipeds, and by the absence of an appendix masculina in the male. The species burrows in sand flat areas around coral heads, with densities of up to 80/m^2. The burrows, usually about 15 cm long, are often blocked by debris such as calcareous algal fragments. The species is considered to play an important role in the transfer of material across the sediment-water interface.

284. Kensley, B., and M. Schotte. 1987. "New records of isopod Crustacea from the Caribbean, the Florida Keys, USA, and the Bahamas, West Indies." Proceedings of the Biological Society of Washington 100 (1): 216-247
Fourteen species of marine isopods are recorded from Belize, the Bahamas, and the Florida Keys. These include a new genus and species of anthuridean, *Licranthura amyle*, resembling the genera *Eisothistos and Stellanthura*, and characterized mainly by the presence of antler-like processes on the antennae, and the following new species: *Mesanthura looensis* (Anthuridae), *Phycolimnoria clarke* (Limnoriidae) (apparently the first record of the genus found in decaying wood), *Cirolana albidoida, Cirolana crenulitelson* (Cirolanidae), *Ancinus belizensis*, and *Cassidinidea mosaica* (Sphaeromatidae). Six species of *Limnoria* are recorded as co-occurring: *L. multipunctata, L. pfefferi, L. platycauda, L. tuberculata, L. indica, L. unicornis*. Of these, the latter two are recorded from the Caribbean for the first time.

Cirolana minuta Hansen is redescribed, this being the second record of the species.

285. Kensley, B., and R. H. Gore. 1980. "*Coralaxius abelei* new genus new species (Crustacea Decapoda Thalassinidea Axiidae) a coral inhabiting shrimp from the Florida Keys, USA, and the western Caribbean Sea." Proceedings of the Biological Society of Washington 93 (4): 1277-1294
Coralaxius abelei gen. et sp. nov. is described from specimens collected from 11-76 m on coral reefs or coralline rock habitat off Carrie Bow Cay, Belize and Key Largo in the Florida Keys. The new genus closely resembles *Axiopsis (Paraxiopsis)* but is separated chiefly by the reduced gill formula, a broad bilobed appendix masculina in the male, biunguiculate dactyls on the last 3 pereopods and eyestalks longer than the rostrum. The species exhibits striking cheliped armature, differing from all other Axiidae in the western Atlantic.

286. Keppner, E. J. 1987. "Observations on three known free-living marine nematodes of the family Ironidae (Nematoda: Enoplida) and a description of *Thalassironus lynnae* n. sp. from northwest Florida." Proceedings of the Biological Society of Washington 100 (4): 1023-1035
Two known species of free-living marine nematodes, *Thalassironus britannicus* and *T. americanus,* are described from sediments vegetated with manatee grass (*Syringodium filiformis*) and shoal grass (*Halodule wrightii*). Differences between specimens from the two habitats are discussed. *Thalassironus lynnae* n.sp. is described from vegetated sediments in St. Andrew Bay. It differs from the other species in the genus by having a long, flagellate tail, shorter more posteriorly located double cervical setae, and by the presence of a segmented, pre-anal papilla in males. A key to the species of the genus Thalassironus is given. Ironella prismatolaima is described from non-vegetated sediments from the Gulf of Mexico off Sea Horse Key, Levy County, Florida.

287. Keppner, E. J. 1988. "*Thoonchus longisetosus* new species and *Oxyonchus striatus* new species of free-living marine nematodes Nematoda Enoplida from northwest Florida, USA." Proceedings of the Biological Society of Washington 101 (1): 183-191
Two new species of free-living marine nematodes from the genera *Thoonchus* and *Oxyonchus* (Nematoda: Enoplida) are described from sediments off the Gulf of Mexico and St. Andrew Bay, Bay County, Florida, U.S.A. *Thoonchus longisetosus* is unique in the presence of distinct labial setae rather than labial papillae, in the size and shape of the amphid, the position of the excretory pore, and in the shape of the gubernaculum. *Oxyonchus striatus* is unique in

the presence of distinct transverse striations of the cuticle and in the size and shape of the spicules and gubernaculum. Keys are provided to the species of each genus.

288. Keppner, E. J. 1989. "Four new species of free-living marine nematodes in the genus *Pareurystomina* (Nematoda: Enoplida) with observations on other members of the genus." Proceedings of the Biological Society of Washington 102 (1): 249-263
Four new species of Pareurystomina and the male of *P. flagellicaudata* are described for the first time from sediments in St. Andrew Bay and the Gulf of Mexico, Bay County, Florida, U.S.A. Additional information is provided for *P. bissonettei, P. floridensis, and P. acuminata.P. americana* n.sp. and *P. vaughtae* n. sp. differ from one another in the shape of the spicules and gubernaculum, and from *P. atypica* in the location of the excretory pore and shape of the spicules and gubernaculum. *P. parafloridensis* n. sp. differs from *P. floridensis* in the number of circles of denticles in the stoma and in the size and arrangement of the denticles. *P. alima* n. sp. differs from *P. parafloridensis* n. sp. in the number of circles of denticles in the stoma, in the absence of a gubernaculum, and in the shape of the spicules. It differs from *P. agubernaculain* the number of circles of denticles in the stoma and the length and shape of the spicules. The genus *Megeurystomina* is placed in synonymy with Pareurystomina, and *M. combesi* becomes *P. combesi* n. comb. A key to the species of the genus *Pareurystomina* is given.

289. Keppner, E. J., and A. C. Tarjan. 1989. Illustrated key to the genera of free-living marine nematodes of the order Enoplida. Seattle, Wash.: National Marine Fisheries Service. NOAA Technical Report NMFS, no. 77.
A pictorial key to 118 genera of free-living marine nematodes in the order Enoplida is presented. Specific morphological and anatomical features are illustrated to facilitate use of the key. The work provides a single key to the genera of enoplid nematodes to facilitate identification of these organisms by nematologists and marine biologists working with meiofauna. (Prepared in cooperation with Florida Univ., Gainesville (USA). Dept. of Entomology and Nematology.).

290. Kilar, J. A., and M. D. Hanisak. 1988. "Seasonal patterns of morphological variability in *Sargassum polyceratium* Phaeophyta." Journal of Phycology 24 (4): 467-473
Temporal variability in certain morphological and taxonomically important features was quantified for *Sargassum polyceratium* Mont. from a population in the Content Keys, Florida (U.S.A.). Patterns of blade development, senescence, and loss caused pronounced seasonal

changes in blade length-width ratios. blade length and width were maximal early in the growing season (August-November) and decreased as the annual stems matured. Early in the growing season, plants had broader blades with randomly distributed cryptostomata. Late in the growing season (February-April), plants had more linear blades with cryptostomata approximately arranged in two rows, one on each side of the midrib. The length-width ratio of blades increased acropetally along the stems and were directly correlated to the size of the cryptostomatal opening and inversely correlated with the number of cryptostomata. The branching pattern of the annual stems ranged from short spur branches to well-developed, lateral axillary branches. The frequency of bifurcated blades increased significantly late in the growing season. Vesicle shape and size and pedicel length were temporally stable. Alated pedicels and mucronate vesicles occurred in low frequencies. The variability of the morphological features used to delineate species within the genus *Sargassum* on the tropical eastern coasts of the Americas is poorly understood.

291. Kilar, J. A., and M. D. Hanisak. 1989. "Phenotypic variability in *Sargassum polyceratium* Fucales Phaeophyta." Phycologia 28 (4): 491-500
Local-scale population differentiation of *Sargassum polyceratium* Montagne from the Content Keys, Florida [USA] was evaluated. Forty-seven phenotypes were recognized based on blade features. The most common phenotype had lanceolate, often undulate, blades with serrated margins. Plants with flat or curly ovate blades or flat linear blades were common. Other phenotypes were rare (< 2% of population). Blade shape occurred over a continuum, ranging from linear to lanceolate to ovate. Intraspecific differences in blade features were extensive; otherwise, morphological traits were usually similar. Unlike previous descriptions of intraspecific variation, divergent morphologies were intermixed, occurring at distances of a few centimeters. There was no evidence to indicate that short-term environmental effects or hybridization between species were responsible for the considerable morphological variation in this population. Furthermore, the failure to recognize the range of phenotypic variability in the genus Sargassum may result in taxonomic inconsistencies when few specimens are collected, when morphological features cross perceived intraspecific boundaries, when phenotypes display different developmental rates, or when species descriptions originate from a single specimen or population. Designating species or intraspecific taxa should be avoided without a complete appreciation of their morphological variability in nature.

292. Kilar, J. A., M. M. Littler, and D. S. Littler. 1989. "Functional-morphological relationships in *Sargassum*

polyceratium Phaeophyta : phenotypic and ontogenetic variability in apparent photosynthesis and dark respiration." Journal of Phycology 25 (4): 713-720
Phenotypic and ontogenetic changes in apparent photosynthesis and dark respiration for *Sargassum polyceratium* Mont. were related to the differential allocation of resources into blades, stems, vesicles, and fertile branches as well as anatomical parameters of surface area, volume, and blade density from a population in the Content Keys, Florida. Three divergent phenotypes were evaluated during four phases of ontogeny: maximum growth (October), peak reproduction (December), senescence (April), and stasis (July). Photosynthetic and respiratory rates changed throughout the year, at different stages of morphogenesis, and among different phenotypes. Photosynthesis was highest during active growth, decreased during reproduction and senescence, and was lowest during stasis. In contrast, respiration was higher during peak reproduction and stasis. Temporal, phenotypic, and ontogenetic changes in apparent photosynthesis were best explained by interactions among anatomical features, growth stages, and source-sink relationships of metabolic reserves and pigments. Surface area:volume (SA:V) ratios played a secondary role. Photosynthetic performance of mature axes decreased with the allocation of resources away from blades to air bladders and fertile branches. Apparent productivity and development of fertile branches on phenotypes were not correlated. High respiratory rates, SA:V ratios, blade areas, and low blade densities occurred on developing axes and were consistent with adaptations to low light fields. Sargassum polyceratium, because of its morphological differentiation, is a relatively complex, physiologically variable alga.

293. Kindinger, J. L. 1986. "Geomorphology and tidal-bar belt depositional model of lower Florida Keys." AAPG Bulletin 70 (5): 607

294. Klein, H. 1970. Preliminary evaluation of availability of potable water on Elliott Key, Dade County, Florida. Reston, Va.: U.S. Geological Survey. Geological Survey open-file report, 70010.
The National Park Service is arranging for the purchase of Elliott Key and adjacent smaller keys in the upper Florida Keys, southeast of Miami, for the proposed Biscayne National Monument. Reviewed possibilities of potable water supplies that will be required in Elliott Key include shallow wells and water storage facilities during the rainy season; roof runoff into cisterns; paved catchments; blending water from different sources; and desalination of brackish water from the Floridan aquifer. Probably the most practical method is desalination. This is based on information on an artesian well drilled to 1,330 feet at the Pennekamp State Park in middle Key Largo and

the reasonable cost of desalination by reverse osmosis.

295. Klein, H. 1971. Depth to base of potable water in the Floridan Aquifer. Tallahassee, Fla.: Florida Dept. of Natural Resources, Bureau of Geology. Bureau of Geology Map Series, no. 42.
A folded map of florida scaled about 110 mi per inch shows by contours and color the approximate depth to the base of potable water in the Floridan aquifer; a short text describes the information on the map and summarizes the hydrologic conditions. The data used in preparing the map were obtained from completed and ongoing hydrologic studies of selected counties, river basins, and other geographic and hydrologic units in Florida. The Floridan aquifer is the principal source of fresh groundwater in central and northern Florida. The fresh-water section in the aquifer is thickest in central Florida, in the Jacksonville area, in an area west of Daytona Beach, and along the northern tier of counties. Major areas of saline-water contamination are southern Florida, much of the east coast, and areas adjacent to the St. Johns and Peace Rivers. Recently the Floridan aquifer has been considered as a source of water for desalination in southern Florida and the Keys, as a storage reservoir for surplus water during rainy seasons, and as a receptacle for injection of certain waste effluents in areas and at depths where the water is highl mineralized. The map portraying the bottom of potable water will be useful to water management agencies in planning for the protection and full utilization of the aquifer.

296. Klein, H., and B. G. Waller. 1985. Synopsis of saltwater intrusion in Dade County, Florida, through 1984 Reston, Va. : U.S. Geological Survey. Water Resources Investigations Report, 85-4101.
The investigation of saltwater intrusion in Dade County by the U.S. Geological Survey began in the late 1930's and continues in cooperation with Dade County, the Miami-Dade Water and Sewer Authority, the South Florida Water Management District, the Florida Keys Aqueduct Authority, and the Homestead Air Force Base. It is through this continuing long-term study of the extent and causes of saltwater movement that assessments can be made of methods and criteria for controlling saltwater intrusion in the highly permeable Biscayne aquifer in Dade County--the sole source of drinking water for the area. This report summarizes the effects that major hydrologic changes--brought about by land reclamation, flood control, and water management by local and regional agencies--have had on saltwater intrusion in Dade County over the years and to delineate the extent of intrusion as of 1984. Saltwater intrusion is particularly dynamic in coastal Dade County because of the high permeability of the limestone composing the Biscayne aquifer,

because of the good interconnection between canals and the aquifer, and because of the seasonal and year-to-year variability of rainfall. The problem is accentuated because urban growth continues to encroach on inland wetland areas which results in lowered inland water levels. This lowering reduces the seaward freshwater hydraulic gradient and the freshwater head at the coast, both of which govern the intrusion of saltwater.

297. Kramer, R. J., and C. J. Dawes. 1987. "Comparison of proximate constituents in 2 seagrasses from the Gulf of Mexico, Florida Keys, and Belize, Central America." Journal of Coastal Research 3 (4): 445-450

298. Kristensen, R. M. 1984. "On the biology of *Wingstrandarctus corallinus* new genus new species with notes on the symbiontic bacteria in the subfamily Florarctinae Arthrotardigrada." Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 145:201-218
A 3rd genus, *Wingstrandarctus* gen. nov., in the subfamily Florarctinae Renaud-Mornant, 1982 (Arthrotardigrada) is established on the basis of *W. corallinus* nov. sp., described from coralline sand habitats, Australia (Coral Sea) and Florida (Florida Keys), USA and includes *W. intermedius* comb. nov., formerly *Halechiniscus intermedius* Renaud-Mornant, 1967. *Florarctus* Delamare Deboutteville and Renaud-Mornant, 1965 is considered a sister group to the new genus, while *Ligiarctus* Renaud-Mornant, 1982 appears to be plesiomorphic. The cephalic vesicles of both *Wingstrandarctus* and *Florarctus* contain symbiontic bacteria. This relationship is compared with similar symbiontic relationships in other animals inhabiting coralline sand and other environments where particulate nutrients are sparse.

299. Kues, B. S. 1974. "Geobiological significance of modern echinoid Echinometra as an agent of bioerosion, southern Florida Keys." 87th Annual Meeting of Geological Society of America and Associated Societies, Miami Beach, Fla, 18-20 Nov 74.

300. Kurczewski, F. E. 1971. "A new Tachyspex from Florida with keys to the males and females of the Florida species Hymenoptera Sphecidae Larrinae." Proceedings of the the Entomological Society of Washington 73 (2): 111-116

301. Kushlan, J. A., and D. A. White. 1985. "Least tern *Sterna albifrons* and roseate tern *Sterna dougallii* nesting sites in the Florida Keys, USA." Florida Field Naturalist 13 (4): 98-99

302. Kushlan, J. A., and F. J. Mazzotti. 1989. "Historic and present distribution of the American crocodile in Florida,

USA." Journal of Herpetology 23 (1): 1-7
The historic and recent distribution of the American crocodile (*Crocodylus acutus*) in Florida is from Vero Beach and Tampa south to the lower Florida Keys. Its nesting distribution is southern Biscayne Bay and northeastern Florida Bay. Both distributions reflect winter temperature. Nesting sites and nonnesting habitat have been lost to development on Miami Beach and the upper Florida Keys, but this loss has been compensated by the creation of artificial nesting sites on spoil banks along southern Biscayne Bay and a westward addition to the nesting range in Florida Bay. Except for the shift in nesting away from developed areas, the general distribution of the American crocodile in Florida is the same as that historically documentable.

303. Kushlan, J. A., and W. B. Robertson, Jr. 1977. "White ibis nesting in the lower Florida Keys." Florida Field Naturalist 5 (2): 41-42

304. Labisky, R. F., and C. M. Moore. 1984. "Population parameters of a relatively unexploited stock of snowy grouper in the lower Florida Keys." Transactions of the American Fisheries Society 113 (3):322-329

305. Labisky, R. F., D. R. Gregory, and J. A. Conti. 1980. "Florida's spiny lobster fishery : an historical perspective." Fisheries 5 (4):28-36
The Florida-based fishery accounts for 98 percent of the spiny lobsters landed commercially in the United States; this catch is comprised almost exclusively of the Florida spiny lobster, *Panulirus argus*.The commercial lobster industry began in the lower Florida Keys during the early 1800's, principally as a bait fishery that supported the local finfish industry. In 1908, landings totaled about 53, 000 pounds, valued at $3,600. The fishery began to exhibit progressive expansion in the 1940's, a trend that continued through the 1970's. A sport (diver) fishery for lobsters, which began in the 1950's, has also gained prominence. Commercial landings in Florida, including catches from international waters, peaked in 1972 at 11.4 million pounds. Retrospectively, the spiny lobster has not only strongly impacted the culture, sociology, and economics of south Florida, but has also emerged to rank second only to shrimp as Florida's leading fishing industry.

306. Lacson, J. M., V. M. Riccardi, S. W. Calhoun, and D. C. Morizot. 1989. "Genetic differentiation of bicolor damselfish (*Eupomacentrus partitus*) populations in the Florida Keys." Marine Biology 103 (4) : 445-451
Electrophoretic variation in proteins encoded by 23 loci revealed substantial genetic differentiation among populations of bicolor damselfish (*Eupomacentrus partitus*)

collected from four coral reefs in the Florida Keys, USA, during 1986-1988. Genetic differentiation was concentrated between a sample collected from Little Grecian Rocks Reef (LGR) and the remaining samples, including fish from a reef only 600 m distant (Grecian Rocks Reef). Genetic distinction of the LGR sample derived from significantly heterogeneous allelic frequencies at six of eight polymorphic loci. Aco-1 (aconitase); Ada (adenosine deaminase); Gpi-2 (glucosephosphate isomerase); Ldh-2 and Ldh-3 (lactate dehydrogenase); and Me-1 (malic enzyme); nevertheless, differentiation at cytosolic aconitase (Aco-1) far exceeded that observed for other loci (fixation index, F sub(ST) = 0.482).

307. Lamb, T., and J. Lovich. 1990. "Morphometric validation of the striped mud turtle (*Kinosternon baurii*) in the Carolinas and Virginia." Copeia 3:613-618
Kinosternon baurii has been traditionally viewed as an inhabitant of peninsular Florida. The variable expression of "diagnostic" striping patterns in this species has complicated the precise demarkation of its northern range, where specimens are often misidentified as *K. subrubrum subrubrum*.Discriminant analysis of 15 shell characters clearly separated *K. baurii* and *K. s. subrubrum*. Discriminant scores, calculated a posteriori for 39 baurii - like Kinosternon from Georgia, the Carolinas, and Virginia, demonstrated complete overlap with the canonical scores of *K. baurii*.Thus, on the basis of both pigmentation patterns and morphometrics, we assign these 39 questionable forms to *K. baurii*.A key and set of discriminant functions that distinguish the species of *Kinosternon* along the Atlantic Coastal Plain are provided.

308. Lane, C. E. 1971. "Oxygen requirements of octopus Briareus Robson at different temperatures and oxygen concentrations." Journal of Experimental Biology and Ecology 7 (3): 263-269

309. Lapointe, B. E. 1985. "Strategies for pulsed nutrient supply to *Gracilaria* cultures in the Florida Keys : interactions between concentration and frequency of nutrient pulses." Journal of Experimental Marine Biology and Ecology 93 (3): 211-222
A factorial design experiment, using in situ cage cultures, was used to investigate the effects of frequency and concentration of nutrient pulses on growth, nutrient uptake, and chemical composition (C, N, P) of *Gracilaria tikvahiae* McLachlan in nearshore waters of the Florida Keys. Both frequency and concentration of the nutrient pulses affected growth and chemical composition of G. tikvahiae, indicating nutrient limitation occurred during the study. Growth of *G. tikvahiae* increased with increasing pulse frequency up to the highest level used (2 multiplied by wk^{-1} at

all pulse concentrations; in contrast, growth increased with increasing pulse concentration to the highest concentration at the low pulse frequency but not at the higher pulse frequencies.

310. Lapointe, B. E. 1987. "Phosphorus- and nitrogen-limited photosynthesis and growth of *Gracilaria tikvahiae* (Rhodophyceae) in the Florida Keys : an experimental field study." Marine Biology (Berlin) 93 (4): 561-568
The relative effects of NH^{+}_{4} (N) and PO^{3-}_{4} (P) on growth rate, photosynthetic capacity (P_{max}), and levels of chemical constituents of the red macroalga *G. tikvahiae* were assayed during winter and summer, 1983 in inshore waters of the Florida Keys by using in-situ cage cultures. During winter, both N and P enrichment enhanced growth over that of ambient seawater however, P rather than N accounted for more (60%) of the increased winter growth. During summer, P, but not N, enhanced growth over ambient seawater and accounted for 80% of increased growth. Similarly, P_{max} was enhanced by both P and N during winter (but mostly by P) and only by P during summer. Elevated C:P, C:N and N:P ratios of G. tikvahiae tissue during winter, but only C:P and N:P ratios during summer, support the pattern of winter N and P limitation and summer P-limitation. This seasonal pattern of N vs P limited growth of *G. tikvahiae* appears to be a response to seasonally variable dissolved inorganic N (twofold greater concentrations of NH^{+4} and NO^{-3} during summer compared to winter) and constantly low to undetectable concentrations of PO^{3-4}. Mean C:P and N:P ratios of G. tikvahiae) tissue during the study were 1,818 and 124, respectively, values among the highest reported for macroalgae.

311. Lapointe, B. E., J. D. O'Connell, and G. S. Garrett. 1990. "Nutrient couplings between on-site sewage disposal systems, groundwaters, and nearshore surface waters of the Florida Keys." Biogeochemistry 10 (3): 289-307

312. Lawrence, J. M. 1974. "Ecological studies of Floridian Eucheuma (Rhodophyta, Gigartinales). Vol. 3, Seasonal variation of carrageenan, total carbohydrate, protein, and lipid." Bulletin of Marine Science 24 (2): 286-299

313. Lawrence, M. B. 1989. "Return of the hurricanes." Weatherwise 42 (1):22-27
There were five hurricanes and seven tropical cyclones in the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico during the 1988 hurricane season. Hurricanes Debby, Florence, Gilbert, and Joan and three tropical storms made landfall. Gilbert wreaked havoc across the northwest Caribbean Sea and southwest Gulf of Mexico, killing 318 people. Joan killed 216 in the southern Caribbean. The

surface pressure in the eye of Hurricane Gilbert dropped to 888 millibars in the northwest Caribbean on September 13. This is a new record minimum sea-level pressure for the Western Hemisphere, breaking the 892-millibar record set in the Florida Keys during the 1935 Labor Day Hurricane. Characteristics of each hurricane and tropical storm are discussed.

314. Laycock, G. 1987. "Keeping a Key pigeon in the Keys." Audubon 89 (2):76

315. Lazell, J. D., Jr. 1984. "A new marsh rabbit *Sylvilagus palustris* from the lower keys of Florida USA." Journal of Mammalogy 65 (1): 26-33
S. p. hetneri ssp. nov. differs from mainland and Upper Keys *S. p. paludicola* in having a short molariform tooth row, high and convex frontonasal profile, broad cranium and elongate dentary symphysis. It differs from *S. p. palustris* in having gray ventral pelage similar to the underside of the tail. The new form is apparently confined to the oolitic Lower Keys where it occurs in small, scattered colonies. The mainland subspecies of *S. palustris* differ from each other only in ventral pelage color and average length of the molariform row. *S. p. paludicola* as redefined occurs northward through peninsular Florida to southeastern Georgia. *Oryctolagus* is a junior synonym of *Sylvilagus*. Keys biogeography is considered relevant to mammalian endemicity.

316. Lazell, J. D., Jr. Wildlife of the Florida Keys : a natural history. Washington, D.C.: Island Press, c1989.

317. Lazell, J. D., Jr., and K. F. Koopman. 1985. "Notes on bats of Florida, Lower Keys, USA." Florida Scientist 48 (1): 37-41
Four species of bats were recorded in Florida's Lower Keys. The record of a *Myotis austroriparius* may be spurious. *Pipistrellus subflavus* and *Tadarida brasiliensis* are known from single individuals thought to have been waifs or dispersers outside their normal range. Only the Antillean fruit bat, *Artibeus jamaicensis,* seems to have a resident population. The zoogeographic significance of colonization of these continental islands from oceanic islands is discussed.

318. Lelkes, G. 1985. "Petrographical studies on Recent tropical shallow-water carbonate deposits. II, Florida Biscayne Bay, Key Largo, and Marquesas Keys, USA." Magyar Allami Foldtani Intezet Evi Jelentesei 1985:309-342.
The second part of this series of papers reports on the results of petrographic analyses of modern carbonate sediments from S Florida. The analyses have encompassed the grain size analysis of samples representing different

sedimentation units of the S Florida shelf, the qualitative and semiquantitative determination of the sedimentary components and the X-ray diffraction analyses of some of the samples. At the inlet to Biscayne Bay, a lagoon characterized by continental margin carbonate mud sedimentation, in the vicinity of Soldier Key, Halimeda-Mollusca-Foraminifera-corals-Corallinacea-bearing calcarenites of sizeable quartzsand content and muddy calcarenites are locally being deposited. In the inner part of the inner shelf, in the neighbourhood of Rodriguez Key of mud bank facies, Halimeda-Mollusca-Forminifera-corals-Corallinacea-bearing muddy calcarenites occur, while in the outer part of the inner shelf, near Marquesas Keys, Halimeda-Mollusca-Foraminifera calcarenites are found. The calcarenites of White Bank on the outer shelf are mainly of Halimeda-Mollusca-corals composition or, in smaller measure, they are composed of ooids. The sediment of the reef platform of Grecian Rock Reef on the shelf's edge is represented by Halimeda-corals-Mollusca-Corallinacea-bearing calcarenites.

319. Leston, D., D. S. Smith, and B. Lenczewski. 1982. "Habitat diversity and immigration in a tropical island fauna : the butterflies of Lignumvitae Key, Florida, USA." Journal of the Lepidopterists' Society 36 (4): 241-255
An annotated account is presented of the 22 resident and 15 casual butterfly species reported from Lignumvitae Key, a small, protected and relatively unspoiled island in the Florida Keys. The fauna, largely Neotropical, is a segment of that found on the Florida mainland and is analyzed in relation to that area and also to Cuba and Andros. The majority of species occur in open habitats, the forest being impoverished. The overall faunal reduction as compared with the mainland is probably an area effect. Among the species on the Key, *Eunica tatila, Hemiargus thomasi* and *Phyciodes frisia* are noted as being in decline elsewhere in south Florida.

320. Leverson, V. H., Peter C. Sinclair, and Joseph H. Golden. 1977. "Waterspout wind, temperature, and pressure structure deduced from aircraft measurements." Monthly Weather Review 105 (6): 725-733
During Sept. 1974, in the Lower Florida Keys, the first successful penetrations of mature waterspouts were accomplished by a specially instrumented research aircraft. Throughout the course of each penetration, the measurement system recorded the temperature, the pressure, and the three-dimensional velocity field near and within the visible funnel. Multiple penetrations of both cyclonic and anticyclonic waterspouts in various life- cycle stages were achieved. The results indicate that the waterspout funnel structure exhibits 1) a warm central core region, 2)

positive vertical velocities of 5-10 m sec^{-1} outside of the warm core, and 3) tangential velocities and horizontal pressure gradients with characteristics similar to, but with magnitudes greater than, those of the dust devil. A scale analysis of each term in the governing equations of motion suggests a simplified set of modelling equations. The simple Rankine-combined vortex model with cyclostrophic flow explains approximately 75% of the total measured pressure deficit. This compares favorably with Sinclair's (1966, 1973) earlier result for the dust devil vortex.

321. Lewis, R. R., and R. C. Phillips. 1980. "Occurrence of seeds and seedlings of *Thalassia testudinum* Banks Ex Konig in the Florida Keys (USA)." Aquatic Botany 9 (4): 377-380

322. Lewis, R. R., and R. C. Phillips. "Experimental seagrass meadow restoration in the Florida Keys, USA." Meeting of the 13th International Botanical Congress, Sydney, N.S.W., Australia, Aug. 21-28, 1981.

323. Lidz, B. H., D. M. Robbin, and E. A. Shinn. 1985. "Holocene carbonate sedimentary petrology and facies accumulation, Looe Key National Marine Sanctuary, Florida, USA." Bulletin of Marine Science 36 (3): 672-700
Bathymetry and bedrock topography show that the bulk of Looe Key National Marine Sanctuary (lower Florida Keys) occupies a shallow (0-7 m), broad (1-2 km wide) ridge between a landward trough (Hawk Channel, < 15 m deep) and the outer margin dropoff (to > 30 m) south of Looe Key Reef. Average sediment thickness in the Sanctuary is 5.7 m and directly behind the reef is 12-15 m. Prevailing direction of sediment transport is from east to west, parallel to the platform margin. Coral rubble has accumulated immediately behind Looe Key Reef, and coral-rich sands have collected both landward and seaward of the reef. Based on seismic reflection and ^{14}C data, rate of sediment accumulation in the Sanctuary has been 1-2 m/1000 yr during the past 7000 yr. The sediment is composed principally of coral, mollusk, and Halimeda fragments with Halimeda being subordinate to the other two. This contradicts the accepted view that sand-size fractions in the Florida reef tract contain more Halimeda than other types of grains, but conforms to a trend of decreasing Halimeda content from north to southwest along the tract. As this trend is accompanied by a gradual increase in the proportion of dead and dying (relative to living) reefs from north to southwest, it appears to reflect greater production of coralline sand (rather than slower Halimeda growth) that results from a marked acceleration of bioerosion of abundant dead reefs in the area.

324. Lineback, J. A. 1970. "Sedimentary facies and distribution of biota in Coupon Bight, Lower Florida Keys." Geological

Society of America. Bulletin 81 (7): 1929-1945

325. Lipsky, L. 1986. "South Florida's water birds." Oceans 19 (3)

326. Little, E. J., Jr. 1972. Tagging of spiny lobsters *Panulirus argus* in the Florida Keys, 1967-1969. St. Petersburg, Fla.: Florida Dept. of Natural Resources, Marine Research Laboratory. Special Scientific Report, no. 31.

327. Little, E. J., Jr. 1977. Observations on recruitment of postlarval spiny lobsters, *Panulirus argus*, to the south Florida coast. St. Petersburg, Fla.: Florida Dept. of Natural Resources, Marine Research Laboratory. Florida Marine Research Publications, no. 29.
Semiquantitative data on recruitment collected at several localities by Witham habitats (floating artificial substrates), plankton nets, and examination of natural fouling communities from Aug. 1964 through Sept. 1971 are summarized. Postlarvae (=pueruli) were collected during all months, but recruitment peaks were more frequent during the spring and fall, except in the lower Florida Keys where summer peaks were occasionally noted. Low summer recruitment along southeast Florida was sometimes associated with reduced salinities from freshwater runoff, but similar recruitment decreases elsewhere could not be attributed to salinity reductions. Nocturnal recruitment peaks during flooding tides in new and first quarter moon phases (81.3% in 1967, 96.8% in 1968) were further sustantiated. Daily catches from similar adjacent Witham habitats varied considerably, indicating a need for further study to develop quantitative sampling techniques. Postlarvae were more abundant in habitats placed in nearshore shallows (depths j0.5-1.0 m Mean Low Water) than in those placed in deeper channels, suggesting the importance of the nearshore environment as juvenile nursery areas. In 30 monthly plankton samples taken with a 3-net vertical array at Whale Harbor Channel (depth j3.0 m), 90% of postlarvae were taken at surface or mid-depth. Ambient light may exert an inhibitory effect upon recruitment, but normal changes in temperatures and salinities probably do not greatly affect recruitment magnitude.

328. Little, E. J., Jr., and G. R. Milano. 1980. Techniques to monitor recruitment of post larval spiny lobsters *Panulirus argus* to the Florida Keys, USA. St. Petersburg, Fla.: Florida Dept. of Natural Resources, Marine Research Laboratory. Florida Marine Research Publications, no. 37.
Monitoring of postlarval spiny lobster recruitment using floating artificial habitat collectors requires that collectors be pervious to fouling organisms for at least 2 mo. prior to deployment. Sampling is necessary during new moon and 1st quarter phases of each lunar month. Two

collectors sampled at 2-3 day intervals should indicate peak recruitment and relative abundance at an appropriately selected station. Replacement of damaged or lost collectors with reserve fouled collectors should be immediate. No sampling site will depict recruitment trends as well as will a combination of several sites. Results obtained while testing monitoring techniques confirmed that significantly greater recruitment occurs during spring. Abnormally high recruitment followed a severe temperature drop (to ~12.5° C) during 1 mo.; an apparently abnormal recruitment decline during 1 summer month is unexplained. No obvious effect of other collector-associated decapod crustaceans on postlarval lobster settlement was noted.

329. Littler, D. S., and M. M. Littler. 1990. "Reestablishment of the green algal genus *Rhipidosiphon* Montagne Doteaceae Bryopsidales with a description of *Rhipidosiphon* Floridensis new species." British Phycological Journal 25 (1): 33-38
The genus *Rhipidosiphon* is reestablished and characterized by an upright, monosiphonous, uncorticated stipe, fine hyaline rhizoids; and a fan-shaped, unistratose, calcified, terminal blade composed of dichotomously branched siphons. *Udotea javensis,* commonly found in the Indian and Pacific Oceans, is herein transferred to *Rhipidosiphon,* with *R. javensis* as the type of the genus. *Rhipidosiphon floridensis* sp. nov., known only from the Florida Keys and Puerto Rico, is described as one of a "pair" species anatomically similar in every respect to *R. javensis* except for the presence of equal constrictions above the dichotomies; *R. javensis* has distinctly unequal constrictions.

330. Lobo, S. L., and P. K. Swart. 1987. "Utilization of freshwater and ocean water by coastal plants of southern Florida." Ecology 68 (6): 1898-1905
The coastal vegetation of southern Florida is undergoing dramatic changes due to the instability of the ocean water-freshwater boundary. These vegetation changes will be determined by the response of each particular species to saline ocean water, particularly whether it can use ocean water or not. In this study, isotopic data were used to determine the relative usage of freshwater or ocean water by plants in the Florida keys. The results indicate that, with some exceptions, plants toward the interior of the keys were using freshwater while those toward the edge were using ocean water.

331. Loeblich, A. R., III, L. A. Loeblich, and E. G. Besada. "Tropical benthic dinoflagellates." Annual Meeting of the American Society of Zoologists, American Microscopical Society, Animal Behavior Society, Crustacean Society, Society of Protozoologists, and the Society of Systematic Zoology, Dallas, Tex., USA, Dec. 27-30, 1981.,

332. Lyons, W. G., D. G. Barber, S. M. Foster, F. S. Kennedy, Jr., and G. R. Milano. 1981. The spiny lobster *Panulirus argus* in the middle and upper Florida, USA, Keys : population structure, seasonal dynamics, and reproduction. St. Petersburg, Fla.: Florida Dept. of Natural Resources, Marine Research Laboratory. Florida Marine Research Publications, no. 38.
The abundance, distribution, size, sex, mating, spawning, molting and incidence of (invertebrate) fouling organisms were studied at 9 stations in the Florida Keys from April 1978-March 1979. Mean and modal carapace length (CL) sizes in different latitudes were compared. The mean CL was below the legal size (73 vs. 76 mm). The decline in the average winter size was attributed to fishery depletion and seaward emigration of larger lobsters. The legal catch during the open season was 1 lb/trap per week, except at deep reef stations, which is < 1/3 of those 2 previous decades. The principal mating season was from April-June. Spawning occurred only at ocean-side stations.

333. Maes, V. O. 1975. "Systematics and biology of *Thala floridana* (Gastropoda: Vexillidae)." Malacologia 15 (1): 43-67

334. Manheim, F. T., Robet H. Meade, and Gerard C. Bond. 1970. "Suspended matter in surface waters of the Atlantic continental margin from Cape Cod to the Florida Keys." Science 167:371-376
Appreciable amounts of suspended matter over 1.0 milligram per liter in surface waters are restricted to within a few kilometers of the Atlantic coast. Particles that escape estuaries or are disharged by rivers into the shelf region tend to travel longshoreward rather than seaward. Suspended matter farther offshore, chiefly amorphous organic particles, totals 0.1 milligram per liter or less. Soot, fly ash, processed cellulose, and other pollutants are widespread.

335. Manker, J. P., and George M. Griffin. 1971. "Source and mixing of insoluble clay minerals in a shallow water carbonate environment : Florida Bay." Journal of Sedimentary Petrology 41 (1): 302-306
Chlorite and smectite dominate the clay-size insoluble residue of Recent carbonate sediments of Florida Bay. Illite and kaolinite also occur in very small quantities. Chlorite is derived from the Atlantic coast and eastern Everglades provinces and is introduced by streams and by tidal channels through the northern Florida Keys. Smectite is derived from the Gulf of Mexico province to the west. In the northern part of Florida Bay, water flow is greatly impeded by a complex bank and basin system, and the clay mineral suites remain relatively segregated near their respective sources. However, in the

southern part of the bay, banks are less frequent, water flow is less impeded, and the clay mineral suites mix gradually across the area.

336. Manning, R. B. 1988. "Notes on albuneid crabs (Crustacea: Decapoda: Albuneidae) from the central east coast of Florida." Proceedings of the Biological Society of Washington 101 (3): 626-632
Three species are reported: *Albunea paretii* Guerin-Meneville, 1853, *Lepidopa benedicti* Schmitt, 1935, and *L. websteri* Benedict, 1903. The latter species is recorded from southeast Florida for the first time. Study material includes rare males of both species of *Lepidopa*. A key to western Atlantic albuneids is presented.

337. Manooch, C. S., III, and D. L. Mason. 1987. "Age and growth of the Warsaw grouper and black grouper from the southeast region of the USA." Northeast Gulf Science 9 (2): 65-76
Opaque rings on sectioned otoliths from warsaw grouper, *Epinephelus nigritus* (N = 124), and black grouper, *Mycteroperca bonaci* (N = 172), were used to estimate age and growth. The aging structures from warsaw grouper were obtained by dockside sampling of headboat landings from North Carolina through the Florida Keys. Black grouper were sampled from headboat landings primarily in the Florida Keys. Annulus formation occurred between April and May for warsaw grouper, and from March through May for black grouper. The weight-length relationship for warsaw grouper is $W = 2.09 \times 10^{-5}L_{2.9797}$, and for black grouper is $W = 5.548 \times 10^{-6}L^{3.141}$, where W = weight in grams and L = total length in millimeters. Mean back-calculated total lengths for warsaw grouper ranged from 292 mm at age 1 to 2, 328 at age 41, and from 260 mm at age 1 to 1,110 mm at age 14 for black grouper. The von Bertalanffy growth equation for warsaw grouper is $Lt = 2,394(1-e^{-0.0544(t + 3.616)})$, and for black grouper is $Lt = 1,352(1-e^{-01156(t + 0.927)})$, where t = age in years and L = total length in millimeters. Both species have growth characteristics that are similar to most other serranids studied along the southeastern United States. Catch curves and a yield-per-recruit model are presented for black grouper.

338. Marcus, E. d. B.-R. 1978. "The western Atlantic species of *Onchidella Pulmonata*." Sarsia 63 (4): 221-224
Three new species, *O. brattstroemi, O. miusha* and *O. wah,* from the Florida Keys and Colombia, are described. The 1st-named species differs from *O. indolens* in having smaller notal tubercles and in the shape of the male organ, and from other Atlantic species in lacking a penial papilla. *O. miusha* with a penial retractor of type II differs from *O. marginata* in lacking a caecum and concretions in the penial sac. *O. wah* has a symmetrical penial papilla much larger than

that of *O. armadilla.* The known Western Atlantic species are enumerated and a key based on the male organ is given.

339. Marcus, E. d. B.-R. 1980. "Review of western Atlantic Elysiidae (Opisthobranchia: Ascoglossa) with a description of a new Elysia species." Bulletin of Marine Science 30(1):54-79 A key and morphological and comparative notes on the species found in warm waters with some remarks on species from other regions are given. *E. halimedae* Baba, 1957, and Burn, 1972, not identical with *E. halimedae* Macnae, 1954, is given the name *E. macnaei* sp. n. *E. patina* from Miami, Florida, is described as a new species.

340. Marshall, M. J. 1985. Stability in an assemblage of caridean and penaeid shrimps inhabiting intertidal Thalassia bed (mouth morphology, competition, predation). Gainesville, Fla.: University of Florida.
Fourteen species of caridean and penaeid shrimps were collected during 27 months of sampling in an intertidal Thalassia bed adjacent to Seahorse Key, Florida. This assemblage was found to be resilient following annually occurring episodes of seagrass blade shedding. Stability was evaluated through three techniques which used differing combinations of the information types available in a species by sample (collection date) data matrix. The finding of stability suggested that deterministic processes controlled assemblage structure. *Hippolyte zostericola,* a small hippolytid, was numerically dominant in 26 of the 27 monthly samples and it was the only species present in all samples. Total and relative abundances of each of the 14 species greatly fluctuated through time. Changes in population size for most species were positively correlated with annual cycles of change in the above ground biomass of seagrasses. The assemblage was found to be resilient despite broad and mostly irregular changes in species abundances. An uneven distribution of individuals among the assemblage members and consistently occurring separation of yearly abundance peaks among the Hippolytidae provided circumstantial evidence that interspecific interactions might regulate assemblage structure. None of the small carideans were found to be detritivores. The hippolytids were micrograzers on algae epiphytic on seagrass blades and the palemonids included an omnivore and a strict carnivore. An SEM examination of their feeding appendages reinforced these findings. Ecological similarity of the hippolytidae was observed in patterns of body size, in seasonal patterns of brooding and recruitment, and in field-determined patterns of feeding activity. Competitive interactions between species were speculated to have contributed to the resilience observed in this grassbed assemblage.

341. Marszalek, D. S. 1975. "Calcisphere ultrastructure and skeletal aragonite from the alga *Acetabularia antillana.*"

Journal of Sedimentary Petrology 45 (1): 266-271

342. Martin, R. E. 1986. "Habitat and distribution of the foraminifer *Archaias angulatus* (Fichtel and Moll) (*Miliolina*, Soritidae), northern Florida Keys." Journal of Foraminiferal Research 16 (3): 201-206

343. Martin, R. E., and Ramil C. Wright. 1988. "Information loss in the transition from life to death assemblages of Foraminifera in back reef environments, Key Largo, Florida (Perte d'information dans la transition des associations vivantes et mortes des foraminiferes dans les milieux d'arriere recif, Key Largo, Floride)." Journal of Paleontology 62(3): 399-410

344. Marx, J. M., and W. F. Herrnkind. 1985. "Factors regulating microhabitat use by young juvenile spiny lobsters, *Panulirus argus* : food and shelter." Journal of Crustacean Biology 5(4): 650-657

345. Marx, J. M., and W. F. Herrnkind. 1985. "Macroalgae *Rhodophyta Laurencia* spp as habitat for young juvenile spiny lobsters *Panulirus argus*." Bulletin of Marine Science 36 (3): 423-431
Field surveys were conducted in the middle Florida Keys [USA] to better document habitat used by newly settled juvenile spiny lobsters, *P. argus*. Early benthic stages were most numerous in locations where they resided in or beneath macroalgal clumps of red algae *Laurencia* spp. Macroalgae provide refuge and support an abundant, diverse fauna preyed upon by young lobsters. Postlarval settlement occurred at monthly intervals, indicating continuous use of the algal microhabitat by successive settlement classes. Patterns of resource use were well defined ontogenetically. From settlement (6 mm carapace length [CL]) through ~17 mm CL, young lobsters remained within algal clumps, thereafter moving to the substrate to take residence in various den structures. The transition from algal to den dwelling was accompanied by a shift from solitary to aggregate habitation. This apparent change in sociality was not rigidity fixed ontogenetically but depended in part on the local distribution of shelter and food.

346. Masner, L. 1980. "A revision of the nearctic species of *Calotelea Hymenoptera* Proctotrupoidea Scelionidae." Canadian Entomologist 112 (4): 397-408
The genus *Calotelea* Westwood of the Nearctic region is revised. Ten species are described as new from the USA, including *C. authracina* sp. nov. ♀ ♂ (New Mexico), *C. atra* sp. nov. ♀ ♂ (Florida), *C. aurulenta* sp. nov. ♀ (Texas, North Carolina), *C. bicolor* sp. nov. ♀ ♂ (Virginia), *C. cincta* sp. nov. ♂ (New Mexico), *C. flava* sp. nov. (Florida, North

Carolina, Texas), *C. lutea* sp. nov. ♀ (Virginia), *C. mellea*, ♀ ♂ (Georgia), *C. nebulosa* sp. nov. ♀ (Georgia, South Carolina) and *c. pulla* sp. nov. ♀ (Florida). The taxonomic concept of Calotelea is reviewed, and the taxonomic position of the 10 Nearctic species is discussed. Keys to females and males are given.

347. Masner, L. 1983. "Revision of the nearctic species of *Trichacis Hymenoptera Proctotrupoidea* Platygastridae." Canadian Entomologist 115 (9): 1071-1094
The Nearctic species of the genus *Trichacis* are revised. Nine out of 15 spp. recognized are new *T. alticola* (New Mexico [USA], Colorado), *T. bison* (Ontario [Canada], Florida, Louisiana, Illinois, Texas), *T. celticola* (Mississippi, Ontario, Louisiana, Texas), *T. dracula* (Illinois), *T. elongata* (Missouri), *T. huberi* (California), *T. mandibulata* (Illinois), *T. pyramidalis* (Ontario) and *T. striata* (Florida). Six previously described Nearctic species are redescribed, *T. arizonensis* (Ashmead), *T. cornicola* (Ashmead), *T. cornuta* Fouts, *T. rufipes* Ashmead, *T. texana* Fouts and *T. virginiensis* Ashmead. The males of *T. arizonensis, T. texana* and *T. virginiensis* are described for the 1st time. A generic diagnosis of Trichacis and keys to Nearctic species are given. The higher classification, bionomics, world distribution, and character states of Trichacis species are discussed.

348. Mathis, W. N. 1989. "A review of the beach flies of the Caribbean and Gulf of Mexico Diptera Canacidae." Proceedings of the Biological Society of Washington 102 (3): 590-608
The beach flies (Diptera: Canacidae) of the Caribbean and Gulf of Mexico, with focus on the species of Belize (Central America), are reviewed. The faunas from the Caribbean and Gulf of Mexico comprise four genera and seven species as follows: *Canacea Cresson (C. macateei* Malloch), *Nocticanace* Malloch (*N. texensis* (Wheeler); *N. wirthi*, new species; *N. panamensis*, new species), *Paracanace* Mathis & Wirth (*P. aicen* Mathis & Wirth; *P. lebam* Mathis & Wirth), and *Procanace* Hendel (*P. dianneae* Mathis). Keys and a diagnosis are provided for each genus and most species, and for *Nocticanace, Paracanace, and Procanace* a key to the species groups on a world basis is furnished. In addition, the texensis group of the genus Nocticanace is revised. Several structures of each new species are illustrated to facilitate their identification.

349. Maul, G. A. 1977. "Annual cycle of the Gulf Loop Current. Pt. 1, Observations during a one-year time series." Journal of Marine Research 35(1): 29-47
The Gulf Loop Current is that portion of the Gulf Stream System which connects the Yucatan Current and the Florida Current in the eastern Gulf of Mexico. An experiment to test

the annual cycle proposed by Leipper (1970) was conducted from Aug. 1972 through Sept. 1973. Twelve pathlines of the 22°C isotherm at 100 m depth were made from Yucatan to the Florida Keys at 36-day intervals in conjunction with a satellite oceanography project. The sequence of pathlines shows an annual cycle of penetration into the eastern Gulf that is in phase with the historical annual cycle of current speeds and transports of the Gulf Stream, and is also reflected in tide gage sea level records taken between Key West, Havana, and Progreso. The data suggest that an excess inflow of Yucatan Current water of 4 X 10^6 m^3 sec^{-1} over outflow of Florida Current water in the upper 500 m is required to make the Loop Current grow; the outflow required to maintain static sea level conditions in the Gulf is postulated to be into the Caribbean Sea through the Yucatan Strait below this reference level. Separation of an anticyclonic eddy appears to be part of the annual cycle, which is shown to have great year-to-year variability.

350. Mazzotti, F. J. 1983. The ecology of *Crocodylus acutus* in Florida : a thesis in ecology (endangered species, osmoregulation). State College, Pa.: Pennsylvania State University.
Crocodylus acutus formerly occupied a much broader range in southeastern Florida. Aerial and boat surveys showed that the current core distribution of *C. acutus* is the extreme southern Florida mainland and northern Key Largo. Most sightings were in bays, ponds, rivers, and canals in mangrove swamps. All known nesting sites are within this area. Approximately 50% of the sightings and captures of non-hatching crocodiles were of immature animals. Thus recruitment into the breeding population appears to be occurring. Seventy-four percent of the known crocodile mortalities that occurred between 1971 and 1981 were related to human activities such as shooting or collision with automobiles. Preservation of the crocodile population will require increasing attention to reducing the adverse effects of man and protection of remaining habitats from disturbance. Crocodiles nest on exposed shoreline beaches, creek banks, and canal banks. The substrate may be composed of marl, peat, or sand. Failure of eggs to hatch is primarily caused by desiccation and flooding, and the nesting period is timed to avoid the driest and wettest periods of the year. Approximately 200 hatchlings are produced each year in Everglades National Park. Hatchlings usually disperse rapidly from their nests, and it was not possible to distinguish between death and dispersal. However, some hatchling crocodiles survived for at least a year in Everglades National Park, on northern Key Largo, and at the Turkey Point power plant site. Turkey Point hatchling crocodiles were found in the cooling canal

system. Here, as in other parts of southern Florida, hatchlings not only tolerated saline water but gained mass under hypersaline conditions. They grow to the size (200 g) at which they showed increased tolerance to sea water by the onset of the dry season in October. Hatchling C. acutus have rates of body sodium and water turnovers similar to those of hatchling Alligator mississippiensis. Both species appear less specialized for life in saline water than C. porosus. In the laboratory, C. acutus held in seawater can osmoregulate behaviorally by drinking brackish water made available by simulating rainfall. The drinking of brackish water combined with rapid growth to a more salt tolerant size seems to be one of the primary specializations of *C. acutus* for life in saline water.

351. McCosker, J. E., and J. E. Bohlke. 1984. "A review of the snake eel genera *Gordiichthys* and *Ethadophis* with descriptions of new species and comments on related Atlantic Bascanichthyins Pisces Ophichthidae." Proceedings of the Academy of Natural Sciences of Philadelphia 136:32-44
The Atlantic mud and sand-burrowing snake eels (family Ophichthidae, tribe Bascanichtyini) of the genera *Gordiichthys* and *Ethadophis* are reviewed. Three new species are described and illustrated. The Atlantic species of *Gordiichthys* are the following: *G. irretitus* Jordan and Davis 1892, from the Gulf of Mexico and Puerto Rico; *G. leibyi* sp. nov. from the east and west coasts of Florida [USA]; and *G. randalli* sp. nov. from Puerto Rico. The Atlantic species of *Ethadophis* are the following: *E. akkistikos* sp. nov. from the Gulf of Mexico and Surinam; *Sphagebranchus foresti* Cadenat and Roux 1964, from Cape Verde; and *Microrhynchus epinepheli* Blache and Bauchot 1972, from Senegal. Osteological descriptions of Gordiichthys and Ethadophis are provided to supplement those of McCosker (1977). Keys to the species of *Gordiichthys and Ethadophis* and keys to, and comments concerning, the genera of western Atlantic bascanichthyin genera are included. *Bascanichthys longissimus* Cadenat and Marchal 1963 is referred to Phaenomonas.

352. McCoy, C. R. 1987. "Observations on a twelve-mile state fisheries jurisdiction." In: National Conference on the States and an Extended Territorial Sea, San Antonio, Texas, 9-11 Dec 1985. Galveston, Tex.: Texas A&M University Sea Grant Program.
Florida's location and varying geographic jurisdiction over saltwater fishing causes unusual enforcement problems. Florida separates two Fishery Conservation Zones (FCZ), the South Atlantic and the Gulf. The state's territorial waters extend nine miles into the Gulf and three miles into the Atlantic. These jurisdictions converge in the Florida Keys,

and application depends on "which side of the island" fishing takes place. Extending federal recognition of state regulatory jurisdiction to 12 miles will not present "undercutting" of enforcement of state law in state waters.

353. McDonald, R. L., C. K. Unni, and R. A. Duce. 1982. "Estimation of atmospheric sea salt dry deposition : wind speed and particle size dependence." Journal of Geophysical Research 87(C2): 1246-1250
Cascade impactor and bulk filter samples of atmospheric sea salt were collected at wind speeds from 3.4 to 10 m/sec at coastal tower sites in the Florida Keys and Eniwetak Atoll as part of the SEAREX (Sea-Air Exchange) Program. Simultaneous dry deposition measurements were made to polyethylene plates. The samples were analyzed for Na as an indicator of sea salt. If the observed atmospheric sea salt particle mass distributions are corrected for the reduced collection efficiency of large particles, the observed dry deposition rates agree well with rates estimated from atmospheric sea salt particle concentrations and theoretical particle deposition velocities derived from gravitational settling velocities or from the equations of Slinn and Slinn (1980, 1981) for deposition to smooth, solid surfaces as well as natural water surfaces. The results emphasize the fact that, even though large particles may represent only a small fraction of the total mass of sea salt over the ocean, they can dominate the dry deposition rates of the sea salt aerosol.

354. McEachran, J. D., and R. E. Matheson, Jr. 1985. "Polychromatism and polymorphism in *Breviraja spinosa* Elasmobranchii Rajiformes with description of three new species." Copeia 4:1035-1052
Preliminary examination revealed that the highly variable species, *Breviraja spinosa,* consists of four distinct color morphs. Principal components analyses based on morphometric characters, univariate analyses of meristic characters and morphology of neurocrania, scapulocoracoids and claspers distinguished among all of the color morphs and, thus, supported the hypothesis that each represents a distinct species and that these are distinct from the only other congener, *B. colesi*. *B. spinosa* occurs from North Carolina to the Florida Keys and is distinguished by its plain-colored dorsal surface, sooty-gray blotches in the central region of the ventral disc, shape of the rostral appendix and structure of the scapulocoracoid. *B. claramaculata* occurs from North Carolina to the Florida Keys and is distinguished by its symmetrically arranged white spots on the dorsal surface, light-colored ventral surface, number of tooth rows in the upper jaw, number of predorsal tail vertebrae and rostral structure. B. schroederi occurs from Honduras to Panama and is distinguished by its plain-colored dorsal

surface, light-colored ventral surface, number of predorsal tail vertebrae and structure of the clasper. *B. nigriventralis* occurs from Panama to French Guiana and is distinguished by its plain-colored dorsal surface, largely black-colored ventral surface, structure of the lower jaw, development of the caudal fin and shape of the scapulocoracoid. Based on the distribution of shared derived character states, *Raja garmani* and *R. yucatanensis* constitute the sister group of *Breviraja; B. claramaculata* is the sister group of the other *Breviraja* species; *B. spinosa, B. schroederi* and *B. nigriventralis* and *B. colesi* form an unresolved trichotomy, in which *B.spinosa* and/or *B. schroederi* represent the sister group of a clade composed of *B. nigriventralis* and *B. colesi.*

355. McKendree, W. G. 1975. "Distribution of halimeda plants and sediments on and around a patch reef near Old Rhodes Key, Florida." Journal of Sedimentary Petrology 45(2): 415-421

356. McNeill, D. F. 1988. "Initiation and development of tidal-inlet reef mounds south Florida." Proceedings of the Sixth International Coral Reef Symposium, Townsville, Australia, 8th-12th August 1988. Volume 3, Contributed Papers (Mini Symposium 11/16 to 22)
Holocene reef mounds initiated and are presently forming within tidal passes between Pleistocene islands of the Florida Keys. The mounds are composed of a basal allochtonous Halimeda grainstone overlain by an autochtonous Porites divaricata framework and associated rubble, along with varying amounts of skeletal debris and carbonate mud.

357. McPherson, B. F. 1969. "Studies on the biology of the tropical sea urchins, *Echinometra lucunter* and *Echinometra viridis.*" Bulletin of Marine Science 19 (1): 194-213

358. Mead, F. W. 1989. "Cotton lace bug, *Corythucha gossypii,* in Florida (Hemiptera: Tingidae)." Entomology Circular (Gainesville) 324
The morphology, food plants, distribution, biology and control of *Corythucha gossypii* are outlined. This species is a pest of a wide range of crops, including *Ricinus communis* and various forest trees, in Florida. A brief key to this and similar species in Florida is provided.

359. Mebs, D., I. Weiler, and H. F. Heinke. 1985. "Bioactive proteins from marine sponges : screening of sponge extracts for hemaglutinating, hemolytic, ichthyotoxic, and lethal properties and isolation and characterization of hemagglutinins." Toxicon 23 (6): 955-962
Aqueous extracts of 48 sponge species from the Red Sea, the Australian Barrier Reef and the Florida Keys were screened

for hemagglutinating, hemolytic, ichthyotoxic and lethal activities. Forty two per cent of the sponge species exhibited agglutinating properties to human erythrocytes of ABO groups. From four species (*Halliclona* sp., *Cinachyra tenuifolia, Callyspongia viridis, Terpios zeteki*) the hemagglutinating factors were isolated by gel filtration and affinity chromatography. A molecular weight of 24,000 was determined for the pure hemagglutinin from Haliclona sp. by SDS electrophoresis and of 22,000 for the semipure hemagglutinin from *Cinachyra tenuifolia* by gel filtration. These hemagglutinins were inhibited by D-lactose, but not by D-melibiose or other oligosaccharides, indicating that they may react with terminal D-galactose ß1 → 4 residues. The other semipure hemagglutinins were not inhibited by various sugars tested. Hemolytic activity to human erythrocytes was present in about 15% of the sponge extracts, showing a close relationship in ichthyotoxic activity. More than half of the sponge extracts caused toxic symptoms in mice when injected i.p. Using various concentrations death occurred within 12-48 hr. The lethal factors seem to be related to components of low molecular weight in the sponge extracts.

360. Mengel, M. E., and J. M. Parks. 1985. "Quantitative shape analysis of carbonate sands by use of contour registration and template matching (Morphoscopie quantitative des sables carbonates a l'aide d'enregistrement de courbes et d'appariement matriciel)." AAPG Bulletin 69

361. Menzies, R. J., and W. L. Kruczynski. 1983. "Isopod Crustacea exclusive of Epicaridea." Memoirs of the Hourglass Cruises 6 (1): 1-126
Species (32) in 26 genera of marine isopod crustaceans (excluding Epicaridea) were captured in a 28-mo. sampling program at 10 stations (6-73 m) along 2 transects on the central west Florida [USA] shelf. Two new species in new genera *Tropedotea lyonsi* (Idotheidae), *Edwinjoycea horologium* (Arcturidae)] are described, as are 8 new species in previously known genera [*Arcturella spinata* and *A. bispinata* (Arcturidae), *Gnathia floridensis* (Gnathiidae), *Mesanthura floridensis* and *Skuphonura lindae* (Anthuridae), *Paranthura floridensis* (Paranthuridae), *Lironeca tropicalis* (Cymothoidae) and *Carpias floridensis* (Janiridae)]. High incidence of new taxa reflects little previous study of Gulf of Mexico and Caribbean shelf isopods. Previously known species were predominantly of West Indian Faunal Province affinity, but several temperate and a few boreal species were present. Coincidence of species from 3 west Florida estuaries with Hourglass shelf species ranged from 18-41%; only 25% of the shelf species have been reported from any west Florida estuary. Fourteen species comprised 92% of all specimens. Habitat partitioning by depth, apparent for many species, was probably related to substrate and associated organisms.

Checklists and analytical keys are provided for all marine isopod species (except Epicaridea) known previously or expected to occur in the Gulf of Mexico and Caribbean Sea from depths less than 600 m.

362. Merriam, D. F. 1989. "Overview of the geology of Florida Bay, review of recent developments : Symposium on Florida Bay--a Subtropical Lagoon, Everglades National Park and Miami, Fla, USA, 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 519 Florida Bay is a shallow-water, triangular-shaped area of about 1,000 square miles wedged in between the south Florida mainland and the string of elongated Florida Keys. Protected by the Keys and mainland, it is open to the southwest into the Gulf of Mexico, but the open-water effects on the Bay are dampened by the anastomosing mudbanks, which cordon the Bay into a series of internal basins (or "lakes" as known locally). Major changes in the Bay usually occur during severe storms (= hurricanes). Because of its geographic position, climate and geological factors, carbonate sediments are generated in the Bay (= a modern carbonate factory). Its accessibility and conditions make it a popular modern analog for understanding ancient sediments in the rock record deposited under similar conditions.

363. Merriam, D. F., J. M. Fuhr, R. V. Jenkins, and P. J. Zimmerman. 1989. "Pleistocene bedrock geology of Florida Bay, the Keys, and the Everglades : Symposium on Florida Bay--A Subtropical Lagoon." Bulletin of Marine Science 44 (1):519-520 The Late Pleistocene Miami Limestone of southern Florida comprises three facies: bryozoan, coral and oolite. The coral facies of Miami is termed the Key Largo Limestone and the oolitic facies, the Miami Oolite (= Key West Oolite). The three facies interfinger locally and all are approximately 130,000 ybp in age. The Florida Keys are an archipelago of elongate coral limestone islands, near-parallel to the present offshore reef, and extend from near Miami, Florida, southwest to Bahia Honda Key and continue under water as far west as the Dry Tortugas. Diamond-drill cores taken of the bedrock in Florida Bay reveal that the bryozoan facies underlies most of the Bay, but in a more complicated manner than previously suspected. Patch reef(s) occur locally in the Bay; one has been identified just east of East Key about 45+ feet thick. In other parts of the Bay, freshwater limestone has been observed. The bryozoan facies is composed of peletal packstones and grainstones and is so named because locally up to 70% of the rock may be composed of colonies of the bryozoan *Schizoporella floridana*.After bryozoans, pellets are the most abundant constituent; other important constituents are miliolids, peneroplids and ooids and locally the unit contains burrows and calcareous worm tubes.

364. Messing, C. G. 1978. "Biological results of the University of Miami Deep-Sea Expeditions. 128, A revision of the comatulid genus *Comactinia* A. H. Clark (Crinoidea: Echinodermata)." Bulletin of Marine Science 28 (1):49-80
A systematic and distributional study was made of comatulids collected by the University of Miami's R/V Gerda in the Straits of Florida and adjacent waters; K100 specimens were collected. The formerly monotypic genus *Comactinia* comprises 2 valid species-*C. echinoptera* and *C. meridionalis*. One of these is further divided into 2 subspecies-*C. meridionalis meridionalis* and *C. meridionalis hartlaubi*. The variability of the genus is examined and illustrated. A discussion of ecology, affinities, and zoogeography is included; a key to the species is presented.

365. Meyer, F. W. 1971. "Preliminary evaluation of the hydrologic effects of implementing water and sewerage plans, Dade County, Florida." Reston, Va.: U.S. Geological Survey. Geological Survey Open-File Report 71003
As urbanization continues in Dade County, Florida, water requirements will increase. If present trends continue, by the year 2020 the total demand for water supplies in Dade County will average 760 MGD. About 12 MGD will be pumped to the Florida Keys. By year 2020, 540 MGD of waste water will be discharged from sewers to the ocean. With increasing runoff and sewage discharged to the ocean, the total consumptive use of water will ultimately exceed the region's developed water supply capability. By 1976, available fresh water may be insufficient to satisfy all competing demands, according to recent projections by the U.S. Corps of Engineers (1968), unless plans for increasing the efficiency of water use are effected. Plans include reduction in storm runoff by large-scale backpumping to Lake Okeechobee and the conservation areas. Other alternatives include separation of storm and sanitary drainage systems and the prevention of fresh water leakage into the sanitary sewer system.

366. Meyer, F. W. 1971. "Saline artesian water as a supplement." Journal of the American Water Works Association 63 (2): 65-71
Large quantities of moderately saline water (less than 5,000 mg/liter dissolved solids) can be obtained from artesian water-bearingzones in the Avon Park Limestone of Eocene age--the top of which occurs at a depth of about 1,200 ft in southern Florida. Small quantities of less saline water can be obtained from artesian water-bearing zones in the Hawthorn, Tampa, and Suwannee formations between 300 and 1,100 ft in depth. Artesian water could be used for small desalting plants in the Florida Keys and coastal lowlands area at considerable savings over using sea water. The use of raw artesian water from below 1,300 ft for dry-weather biologica survival ponds in the Everglades, such as in the Everglades National Park, is

infeasible because the salinity is too high for some species of plants and animals. Generally, piezometric levels, salinities, and flows increase with depth in southern Florida.

367. Meyers, P. A., J. E. Barak, and E. C. Peters. 1978. "Fatty-acid composition of the Caribbean coral *Manicina areolata.*" Bulletin of Marine Science 28 (4): 789-792
Fatty acid compositions of replicate samples of *M. areolata* from the Florida Keys [USA] were analyzed to determine the degree of intraspecific variability. Variability of acids comprising at least 20% of the total was not large. Fatty acids may be useful in comparative studies of these and other corals.

368. Meyers, S. P. 1967. "Foliicolous marine nematodes on turtle grass, *Thalassia testudinum Konig,* in Biscayne Bay, Florida." Bulletin of Marine Science 17 (2): 471-517

369. Meylan, A. B., K. A. Bjorndal, and B. J. Turner. 1983. "Sea turtles nesting at Melbourne Beach, Florida, USA. 2, Post nesting movements of *Caretta caretta.*" Biological Conservation 26 (1): 79-90
Recaptures of 34 loggerhead turtles *C. caretta* tagged at Melbourne Beach, Florida, indicate post-nesting dispersal to widely distributed foraging grounds in the Bahamas, Cuba, the Dominican Republic, along the eastern seaboard of the USA, in the Florida Keys and in the Gulf of Mexico. The most distant recovery was made 1500 km from Melbourne Beach in the Dominican Republic. Three turtles were captured in the Port Canaveral Ship Channel, which was recently discovered to be a hibernation site for Caretta. Travel against the Gulf Stream current is suggested by the recapture of a loggerhead on the north coast of Pinear del Rio, Cuba, 11 days after it was tagged at Melbourne Beach. A minimum speed of travel of 70 km day^{-1} is indicated by this return, which constitutes the most rapid migratory speed reported for *Caretta.* At least 14 of the 34 turtles were captured in nets intended for other marine species.

370. Michel, H. B. 1984. *Chaetognatha* of the Caribbean Sea and adjacent areas." Washington, D.C.: National Marine Fisheries Service. NOAA Technical Report NMFS, 15.
This illustrated manual is a guide to the distribution and identification of the 6 genera and 28 species of benthic and planktonic *Chaetognatha* known to occur in the Caribbean Sea, the Gulf of Mexico, the Florida Straits and the southwestern North Atlantic Ocean. As background, previous studies of chaetognaths in these areas are reviewed, gross morphology of the different forms is described, and instructions on methods of preserving and handling specimens preparatory to identification are provided.

371. Mikkelsen, P. M. 1981. "Mollusks." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP ; 1.

372. Mikkelsen, P. M. 1987. "The Euphausiacea of eastern Florida (Crustacea: Malacostraca)." Proceedings of the Biological Society of Washington 100 (2): 275-295
Twenty-eight species of euphausiacean crustaceans are recorded from off the eastern Florida coast, from collections by the University of Miami and Harbor Branch Foundation, Fort Pierce. *Thysanopoda cristata, T. pectinata, Nematobrachion sexspinosus*, and *Stylocheiron robustum* are newly recorded for the area. Species bibliographies and a key to adult specimens are presented, along with taxonomic and ecological notes.

373. Miller, J. A. 1988. "Coastal plain deposits." In: Hydrogeology. Boulder, Colo.: The Geological Society of North America.
Coastal Plain sedimentary rocks underlie an area extending from Cape Cod, Massachusetts, southward to the Florida Keys, then westward and southward around the periphery of the Gulf of Mexico and across the Yucatan peninsula where they form part of the western boundary of the Caribbean Sea. Coastal Plain rocks range in age from Jurassic to Holocene and generally thicken toward the shoreline. Coastal Plain rocks are generally easily eroded. The sediments underlying the Coastal Plain (consisting primarily of sand, silt, and clay) are all water-laid and were deposited during a series of transgressions and regressions of the sea. Carbonate rocks are less widespread than clastic sediments. The permeability of clastic Coastal Plain sediments is determined primarily by the texture and degree of sorting of the sediment. The geologic factors affecting permeability are: lithology, structure, topography, confining units, carbonate dissolution, and miscellaneous (geopressure, heavy pumping, and permeable basalt flows). Some of these factors have regional influence and some have only local effects. The overall pattern of groundwater flow in major aquifers in Coastal Plain rocks is that of a classic artesian system. Most of the flow is perpendicular to the coastline. Salt water is present in many Coastal Plain aquifers either onshore or offshore.

374. Miller, J. E., and D. L. Pawson. 1984. "Holothurians Echinodermata Holothuroidea." Memoirs of the Hourglass Cruises 7 (1): 1-79
A total of 213 holothurians, representing 16 spp., was collected during a 28 mo. systematic survey of 10 stations along 2 transects (6-73 m) off central western Florida

[USA]. This material, supplemented with 81 additional Gulf of Mexico specimens supplied by the Florida Department of Natural Resources, brings the total number of species reported to 20. Of these species, 19 have previously been reported from the Gulf of Mexico. *Allothyone mexicana* can be considered endemic to the Gulf of Mexico, and *Thyone crassidisca* was recently described. Systematic accounts, pertinent ecological data and line drawings of taxonomically important skeletal elements are included for each species. Keys to all 60 holothurian species known from the Gulf of Mexico are provided. Range extensions for several species are noted.

375. Miller, L. D., D. J. Harvey, and J. Y. Miller. 1985. "Notes on the genus *Euphyes* with description of a new subspecies Lepidoptera Hesperiidae." Florida Entomologist 68 (2): 323-335
A new subspecies of *E. pilatka* (W. H. Edwards) [*E. p. klotsi*] is described from the Florida Keys [USA] and compared with the nominate subspecies [*E. p. pilatka*]. The subspecies of *E. conspicua* (W. H. Edwards) are discussed [*E. c. conspicua* and *E. c. buchholz*: [Ehrlich and Gillhand], and the name *orono* (Scudder) is resurrected for the east coast subspecies [*E. c. orono*].

376. Minno, M. C. 1987. "The population biology of the Schaus swallowtail Papilio aristodemus ponceanus in the Florida Keys, USA." 14th Annual Meeting of the Xerces Society, Gainesville, Florida, USA, June 9-14, 1987. Atala 15 (1-2): 19

377. Mitchell, J. C. 1977. "Geographic variation of Elaphe guttata Reptilia Serpentes in the Atlantic coastal plain." Copeia 1:33-41
Variation in 11 characters of E. guttata is analyzed in 264 specimens (149 males, 116 females) from 18 localities along the Atlantic Coastal Plain. Six characters exhibit clinal variation: ventrals, subcaudals, body blotches, tail length/ total length ratios, amount of ventral pigment and amount of blotch border pigment. Meristic and morphometric clines generally run from low counts in the north to high counts in the south. Pigmentation decreases clinally from southern Florida [USA] through the lower Keys. Discordant variation is present in the remaining 5 characters. The results support a recent inclusion of E. g. rosacea in the synonymy of E. g. guttata.

378. Mitchell-Tapping, H. J. 1981. "Particle breakdown of Recent carbonate sediment in coral reefs." Florida Scientist 44 (1): 21-29
Skeletal particles of the major components of the carbonate sediment of the reef shoal environment were examined using the scanning electron microscope. This examination revealed

no set pattern of skeletal breakdown according to microarchitectural structure, as postulated by the Sorby principle, but that such a breakdown depends on mineralogical composition, wall thickness, grain size and pattern, density and the amount of cementation and bioerosion. To investigate general particle-size abundances and deficiencies in carbonate sediment, samples were taken from the reef crest, back-reef rubble and open-sand ecozones of the reef shoal environments of sites from the Bahamas, Dry Tortugas, Lower Florida Keys, Grand Cayman Island and the USA Virgin Islands. Size analyses of these samples showed that the sediment is moderately well-sorted, coarsely-skewed and leptokurtic. Although particle-size abundances (or modes) exist in each individual site, no particular particle-size abundance is common to all the sites. It is inferred that the particle abundances (or modes) for each site are a product of the sorting potential of the wave energy, and this sorting potential is the major control of the breakdown of sand-sized skeletal particles rather than the microarchitectural structure as proposed by the Sorby principle.

379. Mitchell-Tapping, H. J. 1987. "Application of tidal mudflat model to Sunniland Formation (Lower Cretaceous) of South Florida (Application d'un modele de vasiere tidale a la formation de Sunniland (Cretace inferieur) de Floride Sud)." Gulf Coast Association of Geological Societies and Gulf Coast Section. SEPM meeting. AAPG Bulletin 71

380. Mitchum, G. T., and A. J. Clarke. 1986. "Evaluation of frictional, wind-forced, long-wave theory on the West Florida shelf." Journal of Physical Oceanography 16 (6): 1029-1037 Clarke and Van Gorder have recently formulated a model describing the large-scale, low-frequency response of continental shelf waters to synoptic-scale wind stress in terms of a sum of forced waves. The model includes realistic friction and time dependence and provides an efficient method for calculating the response. Evaluation of the model by using West Florida shelf data gave the following results: 1) the model successfully predicts both the coastal sea level and alongshore velocity component; 2) the West Florida shelf coastal pressure field is dominated by the first mode and can be understood as the sum of a forced wave that travels with the southward-propagating wind stress and a free wave generated at the Florida Keys; and 3) almost all the wind-induced energy on the West Florida shelf is due to the wind forcing acting on West Florida shelf waters. However, a small, but significant, energy flux appears to enter the West Florida shelf from the eastern Florida shelf waveguide.

381. Mitterer, R. M. 1978. "Amino acid composition and metal

binding capability of the skeletal protein of corals." Bulletin of Marine Science 28 (1): 173-180
Corals were collected alive from Bermuda, Jamaica, and the Florida Keys. The following species were analyzed: *Porites porites, Oculina diffusa, Agaricia fragilis, Acropora palmata*, and *A. cervicornis* (scleractinian corals); *Plexaura fuxuosa, Eunicea tourneforti, Gorgonia reutalina, Pseudoplexaura porosa*, and *Plexaurella dichotoma* (alcyonarian corals); and the hydrocoral *Millepora alcicornis*. The calcified organic matrix of these scleractinian and alcyonarian coral skeletons has a protein composition characterized by a predominance of aspartic acid. This predominance is more pronounced for the alcyonarian spicules which contain 2 times as much aspartic acid on a relative basis as the scleractinian skeletons. Aspartic acid comprises j70% of alcyonarian skeletal protein and j35% of the organic matrix of scleractinians. The protein matrix is probably heterogeneous as evidenced by separation into aspartic acid-rich and aspartic acid-poor fractions. The organic matrix from alcyonarian spicules can bind metal ions. The results support the concept that the organic matrix acts as a template which initiates and controls crystal growth. The specific mechanism by which this occurs may be the association of Ca2+ with the free carboxyl group of the aspartyl residues of the protein matrix.

382. Montgomery, R. T. 1978. Environmental and ecological studies of the diatom communities associated with the coral reefs of the Florida Keys. Vol. I and II. Tallahassee, Fla.: Florida State University.

383. Moore, B. J. 1968. "The macro lichen flora of Florida USA Keys." Bryologist 71 (3): 161-266

384. Moore, C. M., and R. F. Labisky. 1984. "Population parameters of a relatively unexploited stock of snowy grouper *Epinephelus niveatus* in the lower Florida Keys, USA." Transactions of the American Fisheries Society 113 (3): 322-329
Age, growth, mortality and reproduction of a relatively unexploited stock of snowy grouper *E. niveatus* from the lower Florida Keys, were studied during April 1978 to July 1981. Biological statistics were derived from 309 snowy grouper. Ages, determined by otolith sectioning, ranged from 0 to XXVII. Back-calculated mean total lengths (TL) ranged from 209 mm at the end of year 1 to 909 mm at the end of year 15. The von Bertalanffy growth equation for snowy grouper was $L_t = 1{,}320\{1-\exp[-0.087(t + 1.013)]\}$, where L = total length (mm), and t = age (years). Annual mortality, determined by catch-curve analysis, was 16%. Full recruitment into the fishery occurred at 575-600 mm TL and at

age VIII. The snowy grouper exhibited protogynous hermaphroditism. Most females (81%) were sexually mature by age IV-V. Males did not appear until age VI, but they comprised 40% of all fish of ages VIII or older. These biological findings preliminarily suggest that snowy grouper stocks in the Florida Keys cannot support an extensive and sustained commercial fishery.

385. Moore, D. E., and M. F. Miller. 1979. "Discovery of living bivalved gastropods in the Florida Keys, USA." Nautilus 93 (2-3): 106
The first living bivalved gastropod was observed by Kawaguti 20 yr ago (Kawaguti and Baba, 1959). Edmunds (1962) reported a series from Jamaica; this species was described as *Berthelinia caribbea* Edmunds, 1963. *B. caribbea* was reported from Puerto Rico by Warmke (1966) and later from Panama and Brazil (Meeder and Moore, 1972). The search for *B. caribbea* in USA waters was unsuccessful for many years; 8 live specimens were collected in the Florida Keys on July 14, 1978. This is the first living species of the family Juliidae to be reported from Florida. A fossil species, Julia floridana Dall, 1898, was described (as a pelecypod) from the Oligocene of northwestern Florida along the Chipola River.

386. Moore, H. K. 1980. "Medicine in the Florida Keys." Journal of the Florida Medical Association 67 (9): 880

387. Morrill, J. 1976. "Notes on parasitic Rhodomelaceae. Part 3, *Meridiocolax narcissus* new genus new species, a new red alga parasitic on *Polysiphonia ferulacea* from the Florida Keys, USA." Proceedings of the Academy of Natural Sciences of Philadelphia 127 (17): 233-248

388. Mount, G. A., and N. W. Pierce. 1974. "Ultra low volume ground aerosols of naled for control of *Aedes taeniorhynchus* in the Florida Keys, USA." Mosquito News 34 (3): 268-269

389. Muchmore, W. B. 1976. "Pseudoscorpions from Florida, USA, and the Caribbean area. Part 5, Americhernes new genus based upon *Chelifer oblongus* Chernetidae." Florida Entomologist 59 (2): 151-163
The genus *Americhernes* is defined, with *Chelifer oblongus* Say, from the eastern USA, as the type species. Also placed in the genus are *Lamprochernes ellipticus* Hoff, from Baja California, Mexico; *L. levipalpus* Muchmore, from Utah; *Americhernes longimanus*, new species, from Florida and the Gulf Coast; *A. reductus*, new species, from the Florida Keys, and *A. puertoricensis*, new species, from Puerto Rico. The relationships between this and allied genera are discussed briefly.

390. Mueller, H.-G. 1989. "*Joeropsis* from northern Colombia with a description of two new species (Joeropsidae aus N-Kolumbien mit zwei Neubeschreibungen (Crustacea: Isopoda: Asellota))." Senckenbergiana Biologica 69 (4-6): 389-396
Marine Isopoda of the genus *Joeropsis* are recorded from the Caribbean Sea of northern Colombia and ecological notes are given. A key to the species of *Joeropsis* from the Caribbean, Bermuda and Florida is presented and two species new to science are described.

391. Muhs, D. R., C. A. Bush, K. C. Stewart, T. R. Rowland, and R. C. Crittenden. 1990. "Geochemical evidence of Saharan dust parent material for soils developed on Quaternary limestones of Caribbean and western Atlantic islands." Quaternary Research (Duluth) 33 (2): 157-177
Most previous workers have regarded the insoluble residues of high-purity Quatenary limestones (coral reefs and oolites) as the most important parent material for well-developed, clay-rich soils on Caribbean and western Atlantic islands, but this genetic mechanism requires unreasonable amounts of limestone solution in Quaternary time. Other possible parent materials from external sources are volcanic ash from the Lesser Antilles island arc and Saharan dust carried across the Atlantic Ocean on the northeast trade winds. Soils on Quaternary coral terraces and carbonate eolianites on Barbados, Jamaica, the Florida Keys (Unites States), and New Providence Island (Bahamas) were studied to determine which, if either, external source was important. Caribbean volcanic ashes and Saharan dust can be clearly distinguished using ratios of relatively immobile elements (Al_2O_3/TiO2, Ti/Y, Ti/Zr, and Ti/Th). Comparison of these ratios in 25 soils, where estimated ages range from 125,000 to about 870,000 yr, shoes tha Saharan dust is the most important parent material for soils on all islands. These results indicate that the northeast trade winds have been an important component of the regional climatology for much of the Quaterary. Saharan dust may also be an important parent material for Caribbean island bauxites of much greater age.

392. Muller, J. 1985. "Les ponts en béton précontraint a voussoirs. Une expérience américaine." Revue Générale de Routes et de Aérodromes 59: 85-93
Rappel des phases du developpement de la technique des ponts a voussoirs aux Etats-Unis. Rappel des procedes de construction des ponts des Florida Keys, de l'experience unique de protection de l'environnement (le viaduc de Linn Cove en Caroline du Nord), des techniques utilisees pour differents viaducs urbains ferroviaires et routiers, de la realisation de ponts a poutres de grande portee et des techniques de conception de ponts a haubans en beton precontraint a voussoirs. (ENPC).

393. Multer, H. G. 1968. "Geology and origin of the Florida Keys." Geological Society of America. Bulletin 79 (11): 1487-1501

394. Muma, M. H. 1967. "Scorpions, whip scorpions, and wind scorpions of Florida Arachnida Scorpionida Pedipalpida and Solpugida." Arthropods of Florida and Neighboring Land Areas 4:1-28

395. Munroe, E. 1976. Moths of America north of Mexico. Fascicle 13 2B, Pyraloidea comprising the subfamily Pyraustinae, tribe Pyraustini. London: E.W. Classey ; Los Angeles, Calif.: Distributed in the U.S. by Entomological Reprint Specialists. This volume concludes the 2-part monograph on the tribe Pyraustini in the subfamily Pyraustinae. Keys to the genera and species, descriptions, information on distribution, literature references, and illustrations (plates) are provided. New species described include: (*Pyrausta roseivestalis* [California, USA], *P. shirleyae* [Florida, USA], *P. pseudonythesalis* [California], *P. klotsi* [Arizona, USA], *P. pseuderosnealis* [Texas, USA], *P. subgenerosa* [California], *P. retidiscalis* [Texas], *P. andrei* [Texas], *P. arizonensis* [Arizona, USA] and *P. antisocialis* [New Mexico, USA]. New subspecies described include: *Pyrausta californicalis sierranalis* [California], *P. subsequalis petaluma* [California], *P. perrubralis shastanalis* [California], *P. scurralis awemealis* [Manitoba, Canada], *P. fodinalis monticola* [California], *P. f. septentrionicola* [Alberta, Canada] and *P. socialis perpallidalis* [Washington, USA]. Two new names are given: *Pyrausta grotei* (= *Pyrausta augustalis* Grote, 1881) and *Pyrausta homonymalis* (= *Herbula? submarginalis* Walker, 1866). Three species are given revised status and 4 are arranged in new combinations [*Pyrausta demantrialis* (Druce) [*Blepharomastix (?) demantrialis*] *P. bicoloralis* (Guenee) (*Asopia bicoloralis*), *P. augustalis* (Felder and Rogenhofer) (Botys augustalis) and *P. aurea* (Hampson) (Pachyzancla aurea)]. [New synonyms are proposed.].

396. Murdock, G. R. 1978. "Circulation and digestion of food in the gastrovascular system of gorgonian octocorals (Cnidaria: Anthozoa)." Bulletin of Marine Science 28 (2): 363-370 Colonies of *Pseudoplexaura porosa* were fed radioactive food while in situ on reefs along the Florida Keys, then collected after various elapsed times. The distribution of radioactivity in each colony was determined and chemical fractionation of the coral tissues with TCA and ethanol was used to provide an indication of the progress of digestion and assimilation of the food. Much of the food is assimilated near the point of ingestion. Digestion is rapid and resembles that reported for the sea anemone *Aiptasia*. Currents measured in the stem canals of the following 9

species of gorgonians gave estimates of maximum speeds ranging from 0.55 mm/sec to 0.97 mm/sec, with most values in the upper part of the range: *Eunicea knighti, Eunicea* sp., *E. calyculata, E. lacineata, Plexaurella nutans, P. dichotoma, P. plumilla, Plexaura flexuosa,* and *Pseudoplexaura porosa*. Some observations are presented on the behavior of currents in the gastrovascular canals.

397. Narang, S. K., P. E. Kaiser, and J. A. Seawright. 1989. "Dichotomous electrophoretic taxonomic key for identification of sibling species A, B, and C of the *Anopheles quadrimaculatus* complex (Diptera: Culicidae)." Journal of Medical Entomology 26 (2): 94-99
Samples of 17 populations of *A. quadrimaculatus* from Florida, Alabama, Arkansas, Louisiana, Mississippi, Tennessee, New York and New Jersey were analysed for genetic variability at 33 enzyme loci. Statistical analysis of electromorph frequency distributions indicated that sympatric sibling (morphologically indistinguishable) species occurred in about 59% of the populations tested. The association of polytene chromosome and electrophoretic patterns of individual field-collected females confirmed species-specific diagnostic allozymes, which were useful in identifying sibling species A, B, and C and in estimating the proportions of each species at the 17 collection sites. A dichotomous electrophoretic key is presented for the identification of sibling species of the *A. quadrimaculatus* complex. The electrophoretic method is better than the ovarian polytene chromosome method, because mosquitoes of both sexes and females irrespective of their gonotrophic condition can be identified.

398. Narang, S. K., P. E. Kaiser, and J. A. Seawright. 1989. "Identification of species D, a new member of the *Anopheles quadrimaculatus* species complex : a biochemical key." Journal of the American Mosquito Control Association 5(3): 317-324
Sibling species D, a new member of the *A. quadrimaculatus* complex, was identified in collections from Pickwick Lake, Tishomingo County, Mississippi and Choctawhatchee, Bay County, in West Florida. This species occurred sympatrically with the previously described species A, B and C. Evidence for identification of species D includes diagnostic allozymes, a lack of polytene chromosomes in the ovarian nurse cells, and inviability of F1 progeny and lack of sperm transfer in hybridization crosses. An electrophoretic taxonomic key for distinguishing species D from A, B and C is presented.

399. Nauman, C. E. 1987. "Schizaeaceae in Florida, USA." SIDA, Contributions to Botany 12 (1): 69-74
Several status changes have occurred for the Florida members

of the Schizaeaceae. The following account brings that information together along with keys and updated distributional information on each taxon. This article is intended to subject that information to public critique prior to its inclusion of the pteridophyte treatment for the Flora of Florida. I openly solicit comments, suggestions, and additional information on these taxa.

400. Nee, M. 1982. "Notes on 2 Linnaean species of *Solanum* Solanaceae." Taxon 31 (4): 730-733
The identity of *S. verbascifolium L.* is established as that of an uncommon species of Solanum subgen. *Leptosteomonum* of the Bahamas, Florida Keys and the Yucatan Peninsula previously known as *S. blodgettii* Chapm. or *S. donianum* Walp. *S. laurifolium* L.f., a later homonym of *S. laurifolium* Mill., is a species of *Cordia* in the Boraginaceae.

401. Nelson, W. G. 1981. "Experimental studies of decapod and fish predation on seagrass Macro benthos." Marine Ecology Series 5 (2): 141-150
The effects of 1 fish and 3 decapod crustaceans were examined in laboratory and field predator enclosure experiments in the Indian River Lagoon, Florida, USA. Results of laboratory and field experiments were similar in most cases. The fish *Lagodon rhomboides* and the crab *Callinectes sapidus* had relatively little effect on macrofaunal abundances. The shrimps *Palaemonetes intermedius* and particularly *Penaeus duorarum* exerted marked negative effects on the density of almost all macrobenthic taxa present. The role of shrimps and other decapods in regulating densities of seagrass macrobenthos may be much greater than previously thought. The decapod crustaceans appear to be important keys to the understanding of trophic complexity in seagrass ecosystems.

402. Neunzig, H. H. 1977. "A new species of *Caristanius* from Florida, USA, Lepidoptera Pyralidae Phycitinae." Proceedings of the Entomological Society of Washington 79 (4): 555-558
C. minimus sp. nov. is described from the Florida Keys [USA]. The larval host is *Cassia keyensis* (Pennell) MacBride.

403. Nichols, S. W. 1988. Systematics and biogeography of West Indian Scaritinae (Coleoptera: Carabidae) (Florida, Mexico). Ithaca, N.Y.: Cornell University.
The Scaritinae (Coleoptera: Carabidae) of the West Indian biogeographic region, including south Florida and the Yucatan Peninsula (in part), are reviewed. A synonymy, adult diagnosis, larval diagnosis, and comments on distribution, general ecology, and immature stages are provided for the subfamily. Similar information is also provided for other supraspecific taxa. Species-level taxa are treated in more detail with information falling under the following headings: synonymy, type locality, diagnosis,

taxonomic notes, distribution, material examined, literature records, ecology, bionomics, immature stages, and parasites. Keys are provided to the tribes of Scaritinae of the world, including *Oxylobini* (new status) and *Pasimachini* (new status), and to all included genera, subgenera, and species. *Antilliscaris* Banninger and *Semiardistomis* Kult are raised from their previous rank as subgenera to full generic status. Two new species are described: *Ardistomis franki* n. sp. (from Hardwar Gap, Jamaica) and *Ardistomis hispaniolensis* n. sp. (from Ennery, Haiti). Fourteen species are newly synonymized and nine new combinations are formed. Sixty-five species of the subfamily Scaritinae are known from the West Indian biogeographic region. Of these, twenty-seven (41.5%) are endemic. Single island endemics are found on six islands: Cuba, Hispaniola, Jamaica, Puerto Rico, Guadeloupe, and Martinique. The Puerto Rican fauna has the highest level of endemism (38% of scaritines are endemic). The endemic West Indian scaritine fauna is dominated by stenotopic halophobic hygrobionts (salt intolerant species that require high levels of moisture), suggesting that fluctuating climates have played a prominent role in shaping the West Indian fauna. The distribution of scaritines and endemic genera of Coleoptera in the West Indies support the view that the Greater Antilles were colonized by over-water dispersal from the mainland, especially by rafting. In addition, the fauna seems to be in a state of flux, with significant numbers of probable introductions by man, particularly among species that are eurytopic with respect to their moisture requirements.

404. Nickle, D. A., and M. S. Collins. 1989. "Key to the Kalotermitidae of eastern United States with a new Neotermes from Florida (Isoptera)." Proceedings of the Entomological Society of Washington 91(2): 269-285
A new species, *Neotermes luykxi* sp. nov., is described from Florida. A key to species of the Kalotermitidae from the eastern USA is provided.

405. Norris, D. R., J. W. Bomber, E. Balech, D. M. Anderson, A. W. White, and D. G. Baden, editors. 1985. "Benthic dinoflagellates associated with ciguatera from the Florida Keys. 1, *Ostreopsis heptagona* sp. nov." In: 3. International Conference on Toxic Dinoflagellates.
A new species of benthic armored dinoflagellate associated with *Gambierdiscus toxicus* in the Florida Keys is described and named *Ostreopsis heptagona*.This species differs from other species of the genus by its larger size and dissimilar plates, particularly 1′, 3′, 5", 6" and 1p. Details of thecal plates are presented and relationships to other benthic dinoflagellates discussed.

406. Norris, J. N., I. A. Abbott, and J. N. Norris, editors. 1985. "*Gracilaria.* Part 1, *Gracilaria* and *Polycavnernosa* from the Caribbean and Florida : Key and list of the species of economic potential." In: Taxonomy of economic seaweeds with reference to some Pacific and Caribbean seaweeds. La Jolla, Calif.: California Sea Grant College Program.

407. Norse, E. A. 1978. "An experimental gradient analysis : hyposalinity as an 'upstress' distributional determinant for Caribbean portunid crabs." Biological Bulletin (Woods Hole) 155 (3): 586-598
This study examines ecological distributions in a guild of Caribbean demersal crabs (family Portunidae) on a gradient in terrestrial influence on aquatic climate, along which the major monotonic physicochemical variable is salinity. Distributions were established by sampling in fresh lotic waters and bays with highly restricted exchange with the sea, which, for marine groups, are constantly and unpredictably climatically severe, respectively, through climatically equable waters around coral reefs. The 16 demersal portunid species collected in Jamaica (the main study area), the Florida Keys, Colombia and Curacao all occur in undiluted seawater, but progressively fewer are found as salinity decreases. Hyposaline biotopes are virtually monopolized by members of the genus *Callinectes,* while *Arenaeus, Portunus and Cronius* spp were found only in higher salinities. Callinectes spp display serial replacement along the gradient; crab stages of *C. maracaiboensis, C. bocourti* and *C. sapidus* occur mainly in fresh waters, whle dominance peaks occur in progressively higher salinities for *C. exasperatus, C. danae, C. marginatus* and *C. ornatus.* Acute hyposalinity tolerances of the common species were determined experimentally, and follow the same order as upstress limits and dominance peaks. The species composition of the guild changes from domination by the most most to the least euryhaline species as likelihood of severe dilution decreases. In biotopes with temporarily ameliorated weather, less euryhaline species invade and may replace more euryhaline species at a rate proportional to the biotope's remoteness from the immigrants' source area. Freshwater *Callinectes* are catadromous, storing energy in hyposaline ecosystems, but reproducing in higher salinities.

408. Nuttall, T. R. 1989. "A new *Elysia* (Opisthobranchia: *Asgoglossa)* from the Florida Keys." Veliger 32(3): 302-307

409. O'Brien, C. W. "*Paralicus minyops* : new genus, new species of Cossoninae from Florida USA, and the Bahama Islands Curculionidae Coleoptera." Southwest Entomology 9 (3): 346-349
A new species, *P. minyops* O'Brien, in a new monotypic genus in the weevil subfamily Cossoninae is described from the Florida Keys and the Bahama Islands. Outline illustrations

of the habitus (dorsal, lateral and ventral), the female 8th sternite and the male phallus are included, along with diagnoses of several similar appearing genera.

410. O'Connor, D. M. 1974. Legal aspects of coastal zone management in the Florida Keys. Tallahassee, Fla.: Florida Coastal Coordinating Council.
The Florida Keys are entering what appears to be a period of of intense development and as a result present an illustration of some of the problems involved in coastal zone management. In the Keys, these problems are presently being dealt with by fragmented authority at various governmental levles, federal, state, and local. The distribution of this authority is reviewed and the decisions which have been made concerning these problems are examined. The distribution of authority as it is exercised in practice is undesirable and is leading to polarization between development and conservation policies at local and state levels. While recognizing that considerable improvement could be made if the Keys are designated an 'area of critical state concern' under existing state land management legislation, the study recommends the creation of a Florida Keys coastal zone management authority. A state agency with overall planning and management responsibility would be designated with the power to apply for and receive federal funding and to manage the states overall coastal zone management program. The regional authority would administer the Keys segment of the state program and would include representation from the local communities.

411. O'Neal, S. W., and J. S. Prince. 1988. "Seasonal effects of light temperature, nutrient concentration, and salinity on the physiology and growth of *Caulerpa paspaloides* Chlorophyceae." Marine Biology (Berlin) 97 (1): 17-24
Caulerpa paspaloides (Bory) Greville were collected during the winter and summer (1978 to 1979) from the Florida Keys, USA. Thalli collected during the winter photosynthesized more efficiently at low light intensities ($1_c < 1$, $I_k = 38$ $\mu E \times m^{-2} s^{-1}$) than did thalli collected in the summer ($I_c = 13$, $I_k = 111$ $\mu E \times m^{-2} \times s^{-1}$). Summer thalli exhibited higher P_{max} values (2.20 mg $O_2 \times g^{-1}$ dry wt $\times h^{-1}$) than winter thalli (1.70 mg $O_2 \times g^{-1}$ dry wt $\times h^{-1}$). Rates of rhizome elongation and frond initiation were strongly inhibited by winter temperatures. The maximum lethal temperature for summer thalli was 37° to 38° C as measured by both growth and photosynthesis. No evidence of nitrogen or phosphorus limitation was found. Relatively minor reductions in salinity (3 $^0/_{00}$ S) resulted in significant increases in rhizome apex motality. Results indicate that low winter temperatures are responsible for reduced winter growth rates previously reported for the Key Largo population. Increased photosynthetic efficiency at low light intensities and preferential maintenance of rhizome elongation over frond initiation appear to allow this tropical

macroalga to optimize growth and survival during the winter.

412. Ogden, J. C. 1977. "The status of the screech owl in the northern Florida Keys." Florida Field Naturalist 5 (2): 49-51

413. Ogunwolu, E. O., and D. H. Habeck. 1979. "Descriptions and keys to larvae and pupae of the grass loopers *Mocis* spp in Florida, USA, Lepidoptera Noctuidae." Florida Entomologist 62 (4): 402-407
Comparative descriptions and keys are given for larve and pupae of 4 spp. of Mocis Huebner, all of which are pests of pasture and turf grasses in Florida. Length and shape of anal setae separate *M. latipes* Guenee and *M. disseverans* Walker from *M. marcida* Guenee and *M. texana* Morrison. No characters of larvae or pupae separate *M. latipes* from *M. disseverans* and *M. marcida* from *M. texana*.

414. Packer, L. 1987. "The triungulin larva of *Nemognatha punctulata* Leconte Coleoptera Meloidae with a description of the nest of its host *Megachile brevis pseudobrevis* Say Hymenoptera Megachilidae." Journal of the Kansas Entomological Society 60 (2): 280-287
Two single cell nest of *Megachile brevis pseudobrevis* are described from the Florida Keys [USA] and compared with the nests of the nominate subspecies. Both cells contained pupae of the meloid beetle *Nemognatha* (Pauronemognatha) *punctulata*. This is the first record of a larval host for this species. The triungulin larva of *N. punctulata* is described and a key to the first instar larvae of the subgenus *Pauronemognatha* is presented. Observations indicate that *Borrichia frutescens* is the preferred host plant for the meloid adults and it seems probable that they oviposit mostly on this species.

415. Pakaluk, J. 1985. "New genus and species of Corylophidae Coleoptera from Florida, USA, with a description of its larva." Annals of the Entomological Society of America 78 (3): 406-409
The adult and larva of a new genus and species, *FOADIA maculata* is described and figured. This species is known only from the Florida Keys, where it has been collected under mangrove bark. A brief discussion of its relationship to other corylophids [*Conodes, Hyplathrinus* and several undescribed genera] is included.

416. Paul, V. J., and M. E. Hay. 1986. "Seaweed susceptibility to herbivory : chemical and morphological correlates." Marine Ecology--Progress Series) 33 (3): 255-264
The susceptibility of 82 species of tropical seaweeds to grazing by herbivorous fishes was assessed on 8 different coral reefs in the Florida Keys, USA. Most species were

simultaneously assayed for the presence or absence of unusual secondary metabolites and recorded as having either calcified or uncalcified thalli. Both production of secondary metabolites and of a calcified thallus were associated with low susceptibility to herbivory. Eighty-five % of calcified species, but only 39% of uncalcified species, produced secondary metabolites. Secondary metabolites were produced by 71% of the species least susceptible to herbivory (<25% eaten) but by only 20% of the species most susceptible to herbivory (>75% eaten). Calcified thalli were produced by 50% of the lowest preference species but by only 9% of the highest preference species. Thus, several common reef seaweeds appear to resist herbivory by relying primarily on chemical deterrents but many appear to combine both chemical and morphological defenses.

417. Pawson, D. L., and I. E. Caycedo. 1980. "*Holothuria thomasi* new species : a large Caribbean coral reef inhabiting sea-cucumber Echinodermata Holothuroidea." Bulletin of Marine Science 30 (2): 454-459
H. (Thymiosycia) thomasi reaches a length of about 2 m and occupies crevices in coral reefs in depths of 3-30 m, where it anchors its posterior end and extends its anterior end outwards to feed on sandy substrates. The ossicles of this highly active species are similar to those of the Indo-Pacific *H. (T.) hilla* Lesson, but differences in body size, color, calcareous ring, habitat and behavior readily distinguish the 2 spp., *H. (T.)* thomasi is known from the Florida Keys [USA], Puerto Rico, Virgin Islands, Lesser Antilles, Colombia, Panama and Mexico.

418. Peck, S. B. 1989. "A survey of insects of the Florida Keys, post-Pleistocene land-bridge islands introduction." Florida Entomologist 72 (4): 603-612

419. Peck, S. B., and C. Beninger. 1989. "A survey of insects of the Florida Keys : cockroaches (Blattodea), mantids (Mantodea), and walkingsticks (Phasmatodea)." Florida Entomologist 72 (4): 612-617

420. Peck, S. B., and H. F. Howden. 1985. "Biogeography of scavenging scarab beetles in the Florida Keys, USA, post-Pleistocene land-bridge islands." Canadian Journal of Zoology 63 (12): 2730-2737
Fieldwork on 15 islands of the Florida Keys produced 13 species [*Deltochilum gibbosum gibbosum, Melanocanthon bispinatus, Pseudocanthon perplexus, Ateuchus lecontei, Copris howdeni, Onthophagus hecate blatchleyi, O. pennsylvanicus, O. tuberculifrons, Aphodius lividus, Ataenius platensis, A. rhyticephalus, Trox foveicollis and T. suberosus*] of scavenging scarab beetles (*Laparosticti and Trox*). Six of these species represent new records for the

Keys. Twenty-three additional species (many of which are synanthropic or tramps), previously recorded from the Keys, were not found. Species-area relationships for the islands form a significant regression line as predicted by equilibrium island biogeography theory. It is concluded that many of the islands have low species numbers either because (i) human habitat disturbance has caused many local species extinctions (ii) species turnover rates (extinction over immigration) are high because of scarcity of suitable hosts or adverse soil conditions. Data from highly disturbed Key West and Stock Island suggest that as species turnover continues, higher species saturation levels may be regained through the immigration of synanthropic and tramp species. This work generally points to the lack of much basis information on scarab beetle bionomics.

421. Pena, J. E., V. H. Waddill, and K. D. Elsey. 1987. "Population dynamics of the pickleworm and the melonworm Lepidoptera Pyralidae in Florida, USA." Environmental Entomology 16 (5): 1057-1061
Larvae and adults of the pickleworm, *Diaphania nitidalis* Stoll, and of the melonworm, *Diaphania hyalinata* L., were sampled in southern and central Florida during 1983 and 1984. Pickleworm (PW) larvae on cultivated hosts were found during the winter in south Florida (0.68-1 larva per m2), and appeared during the spring in central Florida. Major cultivated hosts for the pickleworm in the overwintering sites were squash and zucchini (*Cucurbita pepo* L.), whereas the major host for the melonworm (MW) was the Cuban pumpkin, *Cucurbita moschata* Duchesne. Native hosts of the PW and MW, i.e., *Melothria pendula* and *Momordica charantia*, supported PW and MW larvae during the fall in central and south Florida and during the winter in southern Florida. Adult PW were trapped during the winter only in the Florida Keys and in south Florida.

422. Perkins, T. H. 1985. "*Chrysopetalum, Bhawania,* and two new genera of Chrysopetalidae Polychaeta principally from Florida, USA." Proceedings of the Biological Society of Washington 98 (4): 856-915
The Chrysopetalidae are compared with other families in the order Phyllodocida. *Treptopale,* n. gen., and *Hyalopale,* n. gen., are proposed. *Chrysopetalum hernancortezae, C. heteropalea, C. floridanum, C. eurypalea, Treptopale rudolphi,* and *Hyalopale bispinosa,* all new species, are described from Florida. *Chrysopetalum remanei,* n. sp., is described from the Red Sea. *Chrysopetalum debile* (Grube), *C. occidentale* Johnson, *C. elegans* Bush, *Bhawania goodei* Webster, and *B. heteroseta* (Hartman), n. comb. [from *Paleanotus heteroseta]* from various areas are additionally described. The status of *Chrysopetalum elongatum* 2(Grube) from the Virgin Islands is discussed. Important characters

of the above genera plus *Paleanotus Schmarda, Dysponetus Levinsen,* and three unnamed generic groups are discussed. A generic key and keys to Floridan species of *Chrysopetalum and Bhawania* are provided.

423. Peters, E. C. 1984. "A survey of cellular reactions to environmental stress and disease in Caribbean scleractinian corals : International Helgoland Symposium on Diseases of Marine Organisms, Helgoland, 11 Sep 1983." Helgolaender Meeresuntersuchungen 37 (1-4): 113-137.

424. Pettibone, M. H. 1986. "A new scale-worm commensal with deep-sea mussels in the seep-sites at the Florida Escarpment in the eastern Gulf of Mexico (Polychaeta: Polynoidae: Branchipolynoinae)." Proceedings of the Biological Society of Washington 99 (3): 444-451
Some polynoid polychaetes found living commensally in mantle cavities of deep-sea mussels at the seep-sites near the Florida Escarpment, are described as a new species of *Branchipolynoe, B. seepensis*.They show some differences from the previously described *B. symmytilida,* commensal with deep-sea mussels in the Galapagos hydrothermal vents.

425. Pettibone, M. H. 1989. "Polynoidae and Sigalionidae (Polychaeta) from the Guaymas Basin, with descriptions of two new species, and additional records from hydrothermal vents of the Galapagos Rift, 21° N, and seep-sites in the Gulf of Mexico (Florida and Louisiana)." Proceedings of the Biological Society of Washington 102 (1): 154-168
Eight species of scaled polychaetes are reported from hydrothermal vents of the Guaymas Basin in the Gulf of California: *Neoleanira racemosa* in the Sigalionidae and seven species of Polynoidae, including two new species, *Bathykurila guaymasensis,* in Macellicephalinae, and *Macellicephaloides alvini,* in Macellicephaloidinae. The latter genus and subfamily are reviewed, and a Key to the seven species in the genus is provided. Included are additional records of some species of Polynoidae from hydrothermal vents from the Galapagos and 21° N in the eastern Pacific, as well as seep-sites in the Gulf of Mexico Florida Escarpment and off Louisiana.

426. Pitts, P. A. "Fall and winter air-water heat energy fluxes in shelf waters of the lower Florida Keys." Ocean Sciences Meeting, New Orleans, LA (USA), 12-16 Feb 1990.

427. Platnick, N. I., and M. U. Shadab. 1982. "A revision of the American spiders of the genus Camillina Araneae Gnaphosidae." American Museum Novitates 2748:1-38
The genus *Camillina* is redefined to include those gnaphosids with a preening comb on metatarsi III and IV, closely spaced posterior median eyes, a prolaterally situated bifid

terminal apophysis and medially situated, recessed embolar base on the male palp, and a median epigynal plate. Keys, diagnoses, descriptions, illustrations and locality records are provided for the 40 known American species, found from Mexico and the West Indies south to Chile (with 2 spp. apparently introduced into the southeastern USA). *Drassyllus elegans* (Bryant), *Echemus chilensis* Simon, *E. major* Keyserling, *E. minutus* Mello-Leitao, *E. pedestris* O. P.-Cambridge, *E. pulcher* Keyserling, *Gytha xanthomela* Mello-Leitao, *Zelotes desecheonis* Petrunkevitch, *Z. elytrogaster* Mello-Leitao, *Z. galapagoensis* (Banks), and *Z. marmoratus* Mello-Leitao are transferred to Camillina. Two species names are newly snyonymized: *C. xanthomela* with *C. major,* and *C. elytrogaster* with *C. chilensis*. The male of the Cuban species *C. elegans* is described for the 1st time and the species is newly recorded from Florida, many Caribbean islands. Hawaii, the Marshall Islands, and Angola. The female of the Brazilian species *C. pulcher* is newly described, and the species is recorded from Alabama; the males of *C. pedestris* and *C. arguta* (Simon) are also described for the 1st time. Twenty-nine new species are described.

428. Pomponi, S. A., and S. C. Jameson. 1981. "Sponges." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C.: U.S. Office of Coastal Zone Management. NOAA Technical Report CZ/SP, 1.
Sponges are a major element in coral reef ecosystems. Sponges collected during the Key Largo Coral Reef Marine Sanctuary Deep Water Resource Survey are listed. Also listed are species observed by the author during transect studies of Carysfort Reef in 1975 and 1976. The surveys are listed together for comparison purposes. This survey reports new records of occurrence in the Florida Keys for ?Epipolasis sp. or.

429. Popenoe, J. 1979 (1980). "The genus Spondias in Florida, USA." Proceedings of the Florida State Horticultural Society 92:277-279
Two spp., *S. cytherea* and *S. purpurea,* are of horticultural value to South Florida for their edible fruit. A number of cultivars of *S. purpurea* are grown which mature at different times from May-Oct. Cultivation is restricted to the warmest parts of the peninsula and the Keys because these species are sensitive to frost. The species are adapted to well drained soils and are highly tolerant of drought.

430. Porras, L., and L. D. Wilson. 1979. "*Tantilla oolitica* new status *Reptilia Serpentes* Colubridae from the Florida Keys, USA." Journal of Herpetology 13 (2): 218-220

431. Porter, C. C. 1989. "A new Floridian *Athyreodon ashmead*

(Hymenoptera: Ichneumonidae), with comments on related species of the northern Neotropics." Florida Entomologist 72 (2): 294-304

432. Porter, C. C., and T. J. O'Neill. 1989. "New records for *Xiphosomella* (Hymenoptera: Ichneumonidae) in the southern United States, with description of a new species from Florida." Florida Entomologist 72 (2): 309-313

433. Prince, J. S., and S. W. O'Neal. 1979. "The ecology of *Sargassum pteropleuron* Grunow (Phaeophyceae, Fucales) in the waters off South Florida. I, Growth, reproduction and population structure." Phycologia 18 (2): 109-114
The seasonal growth (change in length), reproduction, and structure of a dense population of *S. pteropleuron* off Key Largo, Florida, are described. The maximum mean rate of increase in plant length occurred during the high water temperatures and nutrient concentrations of the summer months. Rapid loss of annual axes occurred with the end of reproduction in the fall. Reproduction occurred concurrently with a reduction in day length to <11.5 hr and a drop in water temperature which may indicate that short days trigger reproduction in *S. pteropleuron*. The seasonality of seaweed growth in the subtropics is discussed.

434. Purdy, C. B., E. R. M. Druffel, and H. D. Livingston. 1989. "Anomalous levels of Strontium-90 and Plutonium-239, Plutonium-240 in Florida, USA corals : evidence of coastal processes." Geochimica et Cosmochimica Acta 53 (6): 1401-1410
Strontium-90, a radionuclide whose primary source is fallout from nuclear weapons testing, serves as a tritium-like tracer of ocean circulation. The historical record of ^{90}Sr activities in the annual bands of island corals have been shown by other investigators to reflect the ^{90}Sr concentration in surface water at those sites. Strontium-90 activities measured in annual bands in *Montastrea annularis* from the Florida Keys are 30-120% higher than those in correspoding peak activity years (1960-1965) of a Bermuda coral (Diploria). The Bermuda ^{90}Sr activity record reflects the fallout source only, whereas the additional ^{90}Sr activity in the Florida Keys is expected to reflect a coastal runoff source as well as the fallout. The coastal circulation patterns off the northern and western edge of the Florida Current further act to concentrate and prolong the exposure of the runoff ^{90}Sr to the corals. Six measured $^{239,240}Pu$ activities in the Florida coral are 30% of $^{239,240}Pu$ activities in island coral records previously reported. Since Pu is expected to be scavenged by particles in coastal waters, this decrease in $^{239,240}Pu$ substantiates the importance of coastal influences in the Florida ^{90}Sr record. Strontium-90 activities measured in subannual coral

bands from 1973 to 1974 reflect seasonal changes in the ^{90}Sr concentrations in the surface layer of the coastal waters. This may reflect Loop Current intrusion events. The seasonal and long-term coral ^{90}Sr data presented in this paper suggests that coastal ^{90}Sr coral time series may be very useful for documenting coastal circulation patterns.

435. Quensen, J. F., III. 1981. The adaptive significance of shell morphology and color in *Cerion* (Mollusca, Gastropoda, Pulmonata). West Lafayette, Ind.: Purdue University. *Cerion* is a morphologically diverse genus of land snails inhabiting Cuba, the Cayman Islands, Bahama Islands, Hispanola, Virgin Islands, Dutch Antilles, and the Florida Keys. Due to extensive interpopulational variation over 600 species have been described, but nearly all hybridize freely, and only one case of sympatry is known. Morphological variation within populations is much more moderate. The distribution of morphological types has been explained as the result of hurricanes casting ashore lone propagules which founded new populations. But more recent work indicates there is a systematic pattern to the distribution of morphological types. Literature on the adaptive morphology of snail shells is reviewed and applied to *Cerion.* Specifically considered are shell size, color, strength of ribbing, and resistance to crushing. Experiments demonstrating the possible adaptive value of variation in each of these traits were performed and correlations between morphology and habitat were noted. The force necessary to crush shells of seven species and ten populations of *Cerion* was determined using a mechanical crab claw. The populations sampled represent a variety of degrees of shell thickness, ribbiness, shape, and overall size. Models predicting shell strength from measures of shell height, breadth, thickness, and rib height were developed. Predictions of shell strength are consistent with determinations of snails' susceptibility to being crushed by the land crab *Gecarcinus lateralis,* a predator of Cerion. The color of different Cerion ranges from white to almost solid dark brown. It has been demonstrated for other snail species that more darkly pigmented shells absorb more radiant energy, and correlations between color and climate have been noted. Differences in the temperatures of *Cerion* shells of different degrees of mottling were estimated by measuring the temperatures of shells exposed to direct sunlight. Comparisons were also made between shells of different surface textures and ribbiness. The maximum difference between hourly mean temperatures was 3.1°C, between white and heavily mottled shells. The maximum shell temperatures of pigmented shells (48°C) was below the lethal temperature determined in the laboratory when snails were exposed to elevated temperatures for 5 hours (52.5°C). But snails exposed to 42.5°C for one week died of dehydration. It is concluded that white shells should be favored in habitats where there is little or no shade. Nine morphospecies of

Cerion were collected from Abaco Island and Long Island in the Bahamas and from the Florida Keys. Habitat data for each collection site were recorded and included location, elevation, substrate type, shade, predominant vegetation, presence of other snail species, and evidence of predators. Notes were also made of the estivation position at each site, i.e., whether the snails were in leaf litter or above ground on plants or rocks. Snails with stronger shell types, as determined by experimental means, were more commonly found where there were signs of potential predators, especially *Gecarcinus lateralis*. Pigmented snails were more often found in shaded habitats, and white snails in habitats where they were exposed to direct sunlight. Snails at the most exposed sites had a lower height to breadth ratio, and small adult snails and juveniles behaviorally compensate for their greater susceptibility to desiccation by estivating in leaf litter rather than above ground. Thus, the distribution of different *Cerion* shell morphologies is consistent with functional adaptations to local habitat.

436. Quinn, T. M., and D. F. Merriam. 1988. "Evolution of Florida Bay islands from a supratidal precursor : evidence from westernmost Bob Allen Key and Sid Key." Journal of Geology 96(3): 375-381

437. Radwin, G. E. 1977. "The family Columbellidae in the western Atlantic." Veliger 19 (4):403-417
All species of the Columbellidae have a characteristic radular dentition which is described. A tentative phylogenetic arrangement with consideration of morphological similarities and sequence of appearance in time is shown. Shell form was used to indicate intergeneric relationships. The Columbellidae are divisible into 2 subfamilies, the Columbellinae and the Pyreninae. Members of the Columbellinae have comparatively large, strombiform shells. The Pyreninae is a larger group with greater diversity in shell form. Pyrenine species typically have narrow, fusiform shells with strong axial sculpture. Available ecological parameters are tabulated for the western Atlantic Columbellidae. Being mostly epifaunal, many columbellid species live in association with Sargassum, other macroscopic algae, or Thalassia. Temperature, currents, and other factors delimit geographic ranges in such areas as the Straits of Florida, the Trinidad-Tobago Passage, Cape Catoche, Mexico, and southern Brazil. Distribution within and between species groups is largely allopatric. Descriptions and ranges are presented for *Alia unifasciata, Columbella mercatoria, C. rusticoides, Minipyrene Nitidella nitida, Rhombinella laevigata, Zafrona idalina,* and *Z. pulchella*. from Text.

438. Ragan, J., and R. Smosna. 1987. "Sedimentary characteristics of low-energy carbonate beaches, Florida Keys." Journal of

Coastal Research 3 (1): 15-28

439. Relyea, K. G. 1983. "A systematic study of 2 species complexes of the genus *Fundulus Pisces* Cyprinodontidae." Bulletin. Florida State Museum. Biological Sciences 29 (1): 1-64
The *F. heteroclitus-F. grandis* and *F. majalis* species complexes, have nearly identical overall geographic ranges (Canada to northeastern Mexico and New England [USA] to northeastern Mexico, respectively; both disjunctly in Yucatan). *F. heteroclitus* (Canada to northeastern Florida) and *F. grandis* (northeastern Florida to Mexico) are valid species distinguished most readily from another by the total number of mandibular pores (8 and 10, respectively) and the long anal sheath of female *F. heteroclitus, F. majalis* and *F. similis* are conspecific (*F. majalis* has nomenclatural priority) and intergrade in northeastern Florida in the same region in which *F. heteroclitus* and *F. grandis* are sympatric. Overlapping populations in other species groups of fishes, notably *Sphoeroides, Chasmodes* and *Menidia,* occur in the same northeastern Florida area. Both Fundulus population complexes have disjunct Gulf and Atlantic populations, differentiated allopatric populations in the Florida Keys (and Cuba for *F. grandis)* and allopatric related species in Yucatan (*F. grandissimus* and *F. persimilis*). Presumably *F. grandis* and southerly *F. majalis* (*F. similis*-type) evolved in the Gulf of Mexico in isolation from Atlantic coast ancestors during some Pleistocene interglacial period and have recontacted Atlantic populations in northeastern Florida since the Wisconsin glaciation. Yucatan populations of *Fundulus, Floridichthys, Menidia* and *Cyprinodon* and Florida Keys populations of *Fundulus, Menidia, Syngnathus* and possibly *Lucania* and *Cyprinodon* are considered to be glacial relicts.

440. Ritke, M. E., and M. L. Kennedy. 1988. "Intraspecific morphologic variation in the raccoon *Procyon lotor* and its relationship to selected environmental variables." Southwest Naturalist 33 (3): 295-314
Intraspecific variation in morphologic characters of the raccoon (*Procyon lotor)* was investigated using univariate and multivariate statistical analysis. Of 22 cranial characters assessed, all showed significant interlocality variation for males and females. A matrix of correlation among characters was computed, and the first three principal components were extracted. These accounted for 89.1% and 89.7% of the total phenetic variance in the character sets of males and females, respectively. Most character variation was associated with principal component I (a body size index). Three-dimensional projections of localities onto the first three principal components revealed an east-west (longitudinal) pattern of size gradation as well as a latitudinal gradient in size for both sexes; largest raccoons

were found in the northwestern United States (Oregon, Washington, Idaho) and smallest in the southeastern United States (Florida Keys). In general, larger raccoons (for both sexes) inhabited areas characterized by high seasonality and low primary productivity; smaller raccoons inhabited areas characterized by the opposite conditions. Results of this study indicated that patterns of size variation for P. lotor depended upon the geographic area sampled.

441. Rivlin, K. A., J. W. Rachlin, and B. E. Warkentine. 1988. "G-banding of the chromosomes of *Apogon maculatus* and *A. pseudomaculatus* (Perciformes: Apogonidae)." In: 4th Colloquium in Biological Sciences: Blood-Brain Transfer, New York, N.Y., 3 Nov 1986. Annals of the New York Academy of Sciences, v. 529
In a continuation of studies on the cytogenetics of members of the Apogonidae two further methods of G-banding were applied to chromosome preparations of gill epithelial tissue of *Apagon maculatus* and *A. pseudomaculatus*.A modification of the trypsin G-binding procedure of Arrighi and Hsu super(1) was applied to the chromosomes of *A. pseudomaculatus*) collected from the Florida Keys. The method outlined in Rivlin et al. involves colchicine treatment (0.05 mg colchicine per gram of body weight), hypotonic pretreatment (0.4% KCl) of the gill arches, and absolute methanol-glacial acetic acid (3:1) fixation, dabbing the gill filaments onto water-coated precleaned glass slides followed by rapid air-drying.

442. Rivlin, K. A., J. W. Rachlin, and G. Dale. 1987. "Intraspecific chromosomal variation in *Apogon binotatus* (Perciformes: Apogonidae) from the Florida keys and St. Croix." In: 3rd Colloquium in Biological Sciences: Cellular Signal Transduction, New York, N.Y., 4 Nov 1985. Annals of the New York Academy of Sciences, v. 494
This study was undertaken to determine the karyotype of the cardinalfish, *Apogon binotatus*, from two different geographic areas. Chromosomal analysis of six specimens of A. binotatus from the Florida Keys and Tague Bay, St. Croix (U.S. Virgin Islands) was performed as described by Rivlin et al.

443. Robbin, D. M. 1984. "A new Holocene sea level curve for upper Florida Keys and Florida reef tract (Une nouvelle courbe du niveau marin a l'Holocene pour les upper Florida Keys et les zones recifales de Floride)." AAPG Bulletin 68: 522

444. Robbin, D. M., E. D. Gomez, C. E. Birkeland, R. W. Buddemeier, R. E. Johannes, J. A. Marsh, and R. T. Tsuda (eds.) 1981. "Subaerial $CaCO_3$ crust: A tool for timing reef initiation and defining sea level changes." In: The reef and man : proceedings of the Fourth International Coral Reef

Symposium. Volume 2. Quezon City, Philippines: Marine Science Center, University of the Philippines.
Carbon-14 analysis of laminae groups indicated a mode of formation similar to that of subaerial crusts presently forming on the Florida Keys approximately 5 km west of the reef tract. From the results a rough estimation of relative sea-level rise for Alligator Reef, 7,300 yrs BP to present, can be calculated. This rate is about 1 m/1,000 yrs. The projected rate of sea-level rise for Davis Reef for the period 13,700 to 7,300 yrs BP is approximately 0.3 m/1,000 yrs. Recognition and dating of crusts could have application as a tool for establishing the time of reef initiation and calculating relative sea level changes in other areas off reef growth.

445. Robbin, D. M., and J. J. Stipp. 1979. "Depositional rate of laminated soilstone crusts, Florida Keys." Journal of Sedimentary Petrology 49 (1): 175-180

446. Robert, D. J., and C. T. Siemers. "Effect of late Pleistocene karst topography on Holocene sedimentation and biota, lower Florida Keys." Geological Society of America. Bulletin 82 (1): 211-218
Detailed mapping of bedrock topography on Bahia Honda and Big Pine Keys has revealed a buried karst topography not previously documented in the lower Florida Keys. This topography, developed during lowered sea levels of the Pleistocene, strongly controls Holocene sediment thickness and present biotic distribution. Circular to oval sinkholes, which are up to 75 m or more in diameter and over 4 m deep, are usually completely filled with peat and carbonate sediment. Sinkholes are well developed on both the Miami Limestone (oolitic facies) and the Key Largo Limestone (both late Pleistocene in age). Thick sediment in buried sinkholes in more than a few inches of water favors the growth of thick patches of turtle grass (Thalassia testudinum). Shallower water and supratidally located sinkholes (that is, those partly or wholly surrounded by subaerially exposed bedrock) are generally marked by thick growths of either red or black mangroves (Rhizophora mangle and Avicennia nitida). These distinct, nearly circular vegetation patterns are extremely abundant in the study area, as shown by aerial photographs which suggest that Bahia Honda and Big Pine Keys are 'riddled' with sinkholes.

447. Roberts, H. H., L. J. Rouse, Jr., and N. D. Walker. 1983. "Evolution of cold-water stress conditions in high-latitude reef systems : Florida reef tract and the Bahama banks." Caribbean Journal of Science 19 (1/2): 55-60
Thermal depression of shallow bank and bay waters accompanying the passage of severe cold fronts can stress high-latitude coral reef systems, such as those of the Florida Reef Tract and northern Bahama Banks. Laboratory and

field experiments suggest that sustained temperatures below 16°C are detrimental to most reef-building corals. Time-series satellite imagery provides a data base for assessing the thermal variability of waters interfacing with reef systems. Digital thermal IR data acquired by the NOAA-5 meteorological satellite were used to study thermal evolution of Florida Bay and Bahama Bank waters during a succession of three cold-air outbreaks (Jan. 1977). Effects from the third and most important of these frontal systems persisted from Jan. 19 to 26. Northerly winds (to 15 m/sec) accompanied by cold, dry air caused extreme losses of sensible and latent heat from these shallow waters of limited heat capacity. As a result of this process, Florida Bay, Little Bahama Bank, and Great Bahama Bank experienced water temperatures below 16°C for five days. Florida Bay waters reached a temperature minimum of 12.9°C, as determined from satellite data and confirmed by in situ field measurements. Water temperatures in the bay remained under the 16°C lethal limit for corals for eight days. At Dry Tortugas, 91% of the shallow Acropora cervicornis community was reported killed during this abnormally cold event. These studies indicate that the temperature of subtropical bank and bay waters is subject to depression below 16°C accompanying the outbreak of unusually cold air. This superchilled water can have a residence time of days. The cooling process creates water masses that are out of density equilibrium with warmer ocean water. Off-shelf movement of the cold, dense water occurs at particular sites, as shown by time-series satellite data. The absence of coral reefs opposite tidal passes in the Florida Keys is attributed to this process, which probably has limited development of the entire reef tract.

448. Roberts, L. 1987. "Coral bleaching threatens Atlantic reefs." Science 238 (4831): 1228(2)
Rich-brown reef-building corals in the Caribbean basin have turned snowy white, an indication of environmental stress. This bleaching episode could profoundly disrupt the ecology of the Atlantic coral reefs, some of the richest, most productive ecosystems on earth. For reasons unknown, in response to stress, corals expel symbiotic algae; this leaves the reef weakened and may lead to death. The widespread geographical extent of this bleaching incident seems to have started in mid-july 1987 off the Florida Keys. Elevated water temperatures are emerging as the most likely causal agent. (1 map, 1 photo).

449. Rock, B. N. 1972. "The woods and flora of the Florida Keys Pinnatae." Smithsonian Contributions to Botany 5:1-35

450. Ross, A. 1969. "Seasonal changes in Foraminifera at Seahorse Key." Florida Academy of Sciences. Quarterly Journal 32

(2): 108-118

451. Ross, B. E. "Computer model simulation of hurricane & cuts in Florida Keys." 1978 Spring Meeting American Geophysical Union, Miami Beach, Florida, 17-21 Apr 78.

452. Ross, E. S. 1984. "A synopsis of the *Embiidina* of the USA." Proceedings of the Entomological Society of Washington 86 (1): 82-93
The ordinal name *Embiidina* Hagen, 1862, is used in preference to the more recent, less appropriate name, *Embioptera*, Shipley, 1904. All embiids occurring in the continental USA and Hawaii are briefly treated and assigned to proper taxa. The fossil, *Embia florissantensis* Cockerell [Miocene], is assigned to *Lithembia* gen. nov. The subgenus *Dactylocerca* Ross, 1940, of Chelicera Ross, 1940, is elevated to generic status and a new species *D. ashworthi* from Arizona is described. The subgenus *Dilobocerca* Ross, 1944, of Oligembia Davis, 1939, is treated as a synonym of *Diradius* Friederichs, 1934 and *O. caribbeanus* Ross, 1944, described from Cuba, is newly recorded from the Florida Keys. The bisexual form of *Haploembia solieri* (Rambur) is reported as a new introduction to the New World.

453. Ross, M. S., and J. J. O'Brien. 1990. "Ecological site classification of terrestrial habitats of the Florida Keys USA. 75th Annual Meeting of the Ecological Society of America on Perspectives in Ecology--Past, Present, and Future, Snowbird, Utah, USA, July 29-August 2, 1990. Bulletin of the Ecological Society of America 71 (2 Suppl.): 308.

454. Rutherford, E. S., J. T. Tilmant, E. B. Thue, and T. W. Schmidt. 1989. "Fishery harvest and population dynamics of gray snapper, *Lutjanus griseus* in Florida Bay and adjacent waters. Symposium on Florida Bay--A Subtropical Lagoon, Everglades National Park and Miami, FL (USA) 1-5 Jun 1987." Bulletin of Marine Science 44 (1): 139-154
Catches of gray snapper, an important recreational gamefish species in south Florida, have been monitored nearly continuously since 1958 in Everglades National Park total harvest and effort data have been collected since 1973, and lengths have been measured since 1974. Catch rates of gray snapper have fluctuated greatly since 1958 with peaks in 1959, 1964-1966, and 1977-1979. Gray snapper recruit to the park fishery at age 1 and are found in the catch to at least 7 years. Three and 4-year-old fish make up 87% of the catch. Gray snapper are believed to migrate offshore out of the park to spawn since very few ripe adult fish have ever been found in the park. Environmental factors and possible fishing effort on gray snapper in the adjacent Florida Keys may control stock size.

455. Scherer, M. 1976. "Influences of diagenetic environment on porosity and permeability of Holocene and Pleistocene corals." American Association of Petroleum Geologists. Bulletin 60 (12): 2153-2159
Changes in effective porosity and permeability during diagenesis in Holocene and Pleistocene corals from the Bahamas and Florida Keys [USA] are influenced by environmental and by taxonomic variations. Submarine and vadose samples show a decrease in permeability during porosity reduction by cementation, whereas phreatic samples increase in permeability with decreasing porosity because of larger and better sorted pore apertures. As a result, reef rock built mainly of corals may be a better reservoir rock if it has undergone diagenesis in the phreatic zone rather than in the submarine or vadose envirnoments.

456. Schmoker, J. W., and T. C. Hester. 1986. "Porosity of the Miami Limestone (Late Pleistocene), lower Florida Keys." Journal of Sedimentary Petrology 56 (5): 629-634

457. Schomer, N. S., and R. D. Drew. 1982. An ecological characterization of the lower Everglades, Florida Bay, and the Florida Keys. Washington, D.C.: Bureau of Land Management, Fish and Wildlife Service. Biological Services Program Report, FWS/OBS-82/58.1.
A conceptual model of the study area identifies four major ecological zones; terrestrial and freshwater wetlands; Florida Bay and mangrove islands; and the Florida Keys. These are geographically delineated from one another by a combination of elevation gradient and positioning relative to one another and to major outside influences such as upstream watersheds, the continental shelf and major ocean current systems. These zones are delineated by differences in basic physical-chemical background factors such as substrate, climate, hydrology and water chemistry which in turn promote characteristic ecological communities. The terrestrial and freshwater wetlands support pinelands, sawgrass marshes, wet prairies, sloughs and occasional tree islands on freshwater peat, marl and limestone soils. The estuarine and saltwater wetlands support mangrove forests, salt marshes and oscillating salinity systems on mangrove peat, marine marl, sand or 'liver mud' substrates. Florida Bay exhibits oscillating meso-to hypersaline waters over grassbeds on marine lime mud sediments. These mud banks form an anastomosing pattern surrounding deeper 'lake' areas having only a thin veneer of sediment. The exposed tips of the mud banks frequently support mangrove or salt prairie vegetation. The Florida Keys support almost all of the above communities to some small degree but are more prominently characterized by extensive offshore coral reefs. The productivity of these communities with regard to fish and wildlife reflects: the diversity and type of habitats available to species that are potentially capable of exploiting them; the

degree of alteration of these habitats by man and natural forces; and historical, biogeographic and random factors that restrict organisms to specific environments or prohibit them from exploiting a potential habitat.

458. Schreiber, R. W., and P. J. Mock. 1988. "Eastern brown pelicans : what does 60 years of banding tell us." Journal of Field Ornithology 59 (2): 171-182
Analysis of the 3106 recoveries of Brown Pelicans banded in North and South Carolina and Florida [USA] between 1925 and 1983 indicate an 8.8% recovery rate with most recoveries occurring outside the breeding season. Florida birds move shorter distances than do Carolina birds. Carolina birds disperse southward and winter mostly in Florida. Florida pelicans are primarily year-round residents. Some east coast Florida birds move north, but many are found dead in the Keys and in Cuba. Most west coast Florida birds remain there. Distinct migratory patterns exist and most mortality occurs during migration, especially of young birds. More than half the banded pelicans recovered die from human activity, with entanglement in fish line a major cause of mortality. A life table presently cannot be calculated for this species, but a reproductive life of only 4-7 yr seems indicated for this population. Food supply and cold weather are important considerations in the biology and distribution of Brown Pelicans. Banding of adults and nestlings should continue.

459. Schroeder, R. E. 1971. Investigations on the gray snapper, *Lutjanus griseus.* Coral Gables, Fla.: University of Miami Press. Studies in Tropical Oceanography, no. 10.

460. Schum, R. T., and M. D. Schwartz. 1985. "Revision of the plant bug genus *Rhinacloa* with a phylogenetic analysis Hemiptera Miridae." Bulletin. American Museum of Natural History 179 (4): 379-470
The genus *Rhinacloa Rueter* is revised. Thirty seven species are included, 17 of which are described as new [*R. azapa, R. betanzos, R. cajamarca, R. carvalhoi, R. chapini, R. fernandoana, R. juli, R. manleyi, R. mesoamericana, R. mysteriosus, R. nigripennis, R. pallidipennis, R. penai, R. puerforicensis, R. rubroornata and R. schaffneri*]. *Campylomma cardini* Barber and Bruner, *Europiella mella* Van Duzee, *Psallus incaicus* Carvalho and Gomes, *Psallus insularis* Carvalho, *Psallus longirostris* Carvalho, *Psallus usingeri* Carvalho and *Sthenarus basalis* Reuter are transferred to *Rhinacloa*. The following new synonymies are created: *Rhinacloa antennalis* (Reuter) = *Rhinacloa melanotelus* Reuter, *Rhinacloa clavicornis* (Rueter) = *Rhinacloa subpallicornis* Knight and *Rhinacloa lepagei* Carvalho; *Rhinacloa forticornis* Reuter = *Psallus minutulus* Reuter and *Rhinacloa incerta* Reuter; *Rhinacloa basalis* (Reuter), new

combination = *Rhinacloa pallida* Reuter, *Rhinacloa pusillus* (Knight), and *Rhinacloa castanea* Carvalho; *Rhinacloa pallidipes* Maldonado = *Lepidopsallus riodocensis* Carvalho and *Rhinacloa punctipes* Maldonado. *Demarata mirifica* Distant is treated as a species incertae sedis. *Rhinacloa araguaiana* Carvalho is transferred to *Paramixia Reuter (Pilophorini). Lygus ordinatus* Distant is placed in *Ellenia Reuter* (Phylim). Illustrations are presented for the antennae and male genitalic structures of most known *Rhinacloa* species; scanning electron micrographs are presented for the pretarsus and scale-like setae of many species. A key to separate the included species is included. A phylogenetic analysis of the species is presented, using *Campylomma verbasci* Meyer-Dur, *Microphylidea prosopidis* Knight, and *Nigri miris pallipes* Carvalho and Schaffner for outgroup comparison. Distributional maps are provided for all species, indicating a range for *Rhinacloa* from the southwestern United States, the Caribbean including the Florida Keys (with three widely distributed species occurring in Florida), the Galapagos Islands, and south to northern Argentina and central Chile. *Rhinacloa forticornis* is introduced into Hawaii.

461. Schwartz, A. 1987. "The butterflies of the lower Florida Keys, USA." Milwaukee Public Museum. Contributions in Biology and Geology 73:1-34
Sixty-nine species of butterflies (including skippers) are reported from the Lower Florida Keys. Observations on habitat, behavior, winter-spring abundance, oviposition, and other natural history topics, based on a collection of 1336 specimens and records in the literature, are given. The Upper Keys butterly fauna consists of sixty-one species, less than that of the Lower Keys. However, when vagrants are taken into account, the Lower Keys harbor 56 resident species and the Upper Keys 44 species. The difference is attributed primarily to the differing geological histories of the two groups of keys.

462. Schwartz, A. 1970. "*Sphaerodactylus notatus* reef gecko." Catalogue of American Amphibians and Reptiles 90:1-2

463. Schwartz, A., and O. H. Garrido. 1985. "The Cuban lizards of the genus *Sphaerodactylus Sauria* Gekkonidae." Milwaukee Public Museum. Contributions in Biology and Geology 62:1-67
The nigropunctatus group of Antillean geckoes is considered to include the species *S. nigropunctatus, S. torrei, S. cinereus, S. intermedium, S. docimus* (new species), *S. ruibali,* and *S. armasi.* Of these, all are Cuban with the exception of *Hispaniolan S. cinereus.* The problematical species *S. alayoi* is considered a subspecies of *S. nigropunctatus,* and *S. torrei ocujal* is considered a subspecies of *S. nigropunctatus.* Variation, distribution,

and ecological information are presented on all species and subspecies in this and other groups discussed herein. The species *S. nigropunctatus* is considered basal, with two evolutionary lines: *S. torrei* and *S. cinereus* on one hand, and *S. intermedius, S. docimus, S. armasi,* and *S. ruibali* on the other. Of these derived species, *S. ruibalis* is considered the most advanced and the most aberrant of the group. Competition with more advanced sphaerodactyls of the notatus group is considered as important in the present distribution of nigropunctatus group members; extreme differences in size between Bahamian *S. nigropunctatus* and *S. notatus* allow for co-existence of these two species in the Bahama Islands, and the establishment of human settlements along the southern Cuban coast has helped in the abundance of some members of this group in that area. Variation and distribution of two members (*S. celicara* Schwartz and Garrido is not discussed, since there is no new information on that taxon) of the notatus group, *S. notatus* and *S. bromeliarum,* are given, and a total picture of the notatus group in the Antilles is presented. Evidence suggests that the group was originally Hispaniolan, from which center invasion took place to Puerto Rico, where there was extensive radiation, and to Cuba, where there has been little radiation. Sphaerodactylus ramsdeni is also discussed in detail. The affinities of this species remain uncertain, but it is suggested that *S. ramsdeni* may be most closely related to Jamaican, *S. goniorhynchus,* although the evidence is slight. It is probable that *S. ramsdeni* is a remnant of an old Sphaerodactylus stock whose relationships are now obscured. Details of the variation and distribution of *S. argus* and *S. elegans,* both on and outside Cuba, are discussed. The former is considered to be a Jamaican adventive that has not differentiated from its Jamaican parent population.

464. Semple, J. C., and K. S. Semple. 1977. "*Borrichia x Cubana : Borrichia frutescens x Borrichia arborescens* : interspecific hybridization in the Florida Keys, USA." Systematic Botany 2 (4): 292-301

B. frutescens and *B. arborescens* are essentially allopatric except in subtropical south Florida [USA] and Bermuda. In the region of sympatry in Florida the species form hybrids, originally described as B. cubana. Nine populations of hybrids were examined. Analysis of morphological characteristics of 64 individuals from the single population studied intensively indicated that the population was a hybrid swarm. Some individuals were also determined to be chemically intermediate between the parental forms. Both parental species and the hybrids formed 14II during meiosis. Experimentally produced hybrids were morphologically similar to the wild plants. An experimentally produced F2 backcross individual indicates the possibility of some *B. frutescens*

traits introgressing into *B. arborescens*. The presence of *B. frutescens* in the Florida Keys may be influencing the direction of evolution of *B. arborescens* there.

465. Serafy, D. K. 1979. "*Echinoids Echinodermata* Echinoidea." Memoirs of the Hourglass Cruises 5 (3): 1-120
Echinoid species (25), including more than 44,000 specimens, were collected during Project Hourglass, a 28-mo. survey of 10 stations along 2 transects (depths 6-73 m) off the west Florida [USA] shelf. Differential diagnoses and information on distributions and substrate affinities are provided for all species; notes on diet, growth and reproduction, population dynamics, gear selectivity and morphometric and meristic relationships are provided for more common species. Keys to orders and 91 spp. and/or subspecies from the Gulf of Mexico or adjacent waters are provided; there is also a glossary of terms. Species and stations clustered into an inner shelf group at 6-18 m, a transitional group of stations at 37 m and an outer shelf group at 55-73 m. The Gulf of Mexico has few endemic echinoid species; the fauna is composed primarily of species with tropical origins which have invaded the Gulf to varying degrees.

466. Sharkey, M. J. 1990. "A revision of *Zacremnops* Sharkey and Wharton (Hymenoptera: Braconidae: Agathidinae)." Proceedings of the Entomological Society of Washington 92 (3): 561-570

467. Shaver, P. 1980. "Marine sanctuaries." Defenders 55 (3)

468. Shelley, R. M., and G. B. Edwards. 1987. "The scolopendromorph centipedes of Florida, with an introduction to the common myriapodous arthropods." Entomology Circular, Division of Plant Industry, Florida Department of Agriculture and Consumer Services 300

469. Shen, G. T., and E. A. Boyle. 1987. "Lead in corals : reconstruction of historical industrial fluxes to the surface ocean (Plomb dans les coraux : reconstitution des flux industriels historiques a la surface de l'ocean)." Earth and Planetary Science Letters 82 (3/4): 289-304

470. Shinn, E. A. 1988. "The geology of the Florida Keys." Oceanus 31 (1): 46-53

471. Shinn, E. A., B. H. Lidz, and C. W. Holmes. 1990. "High-energy carbonate sand accumulation : the quicksands, southwest Florida (USA) Keys." Journal of Sedimentary Petrology 60 (6): 950-967
High-resolution seismic-reflection profiles of the Quicksands, located along a broad ridge on the platform shelf west of Key West, Florida, indicate a significant

deposit of non-oolitic carbonate sand occurs in a belt 47 km long by 28 km wide. The surface of the belt is ornamented by large (5 m), migrating tidal bars, oriented in a north-south direction, on which sand waves oriented in an east-west direction, are superimposed. Some of the sand waves are awash at low tide. The sand waves are formed by strong reversing tidal currents flowing between the Gulf of Mexico and the Straits of Florida. The waves migrate directly over Pleiostocene bedrock to the east, but the deposit thickens to the west and sand waves there overlie non-oolitic Holocene accumulations as thick as 12 m. Westward-dipping accretionary bedding indicates that net migration of the sands is to the west, despite north-south movement of tidal currents. The westward edge of the accumulation has accreted over deeper, muddier deposits. Although tidal currents and resultant bedforms appear identical to those of active ooid deposits in the Bahamas and elsewhere, no oolitically coated grains were found in this study. Thin-section analyses show the principal component (average 48%) of the sands is fragmented plates of species of the green alga Halimeda, followed by particulate coral (average 17%), which increases off the flanks of the main sand body. Short vibracores confirm the presence of cross-bedding.

472. Shinn, E. A., B. H. Lidz, and C. W. Holmes. 1990. "High-energy carbonate-sand accumulation, the quicksands, southwest Florida Keys." Journal of Sedimentary Petrology 60 (6): 952-967

473. Shinn, E. A., C. W. Holmes, J. H. Hudson, D. M. Robbin, and B. H. Lidz. 1982. "Non-oolitic high energy carbonate sand accumulation : the Quicksands, southwest Florida Keys, USA." American Association of Petroleum Geologists Annual Convention with Division: SEPM/EMD/DPA, Calgary, Alberta, Canada, June 27-30, 1982. AAPG Bulletin 66 (5): 629-630.

474. Shinn, E. A. and S. C. Jameson. 1981. "Geology." In: Key Largo Coral Reef National Marine Sanctuary Deep Water Resource Survey. Washington, D.C.: U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. NOAA technical report CZ/SP, 1.
Two dives were made on June 3, 1979, as part of the key Largo Coral Reef Marine Sanctuary Deep Water Resource Survey. The first dive was seaward of French reef in the southern area of the sanctuary, and the second was on an isolated reef between The Elbow and Carysfort reefs in the northern area. The two dives are described separately in a travelog fashion. Through these submersible dives, previous scuba dives, and discussions with other divers, the collective observations are made that coral reefs or rock prominences do not extend beyond a depth of approximately 40 m in the middle keys area. Whereas reefs are present beyond these

depths in other parts of the Caribbean, the lack of reefs in these depths off the middle Florida Keys are explained. Probably the most significant finds were the algal stromatolitic structures Phormidium hendersonii in 33.5 m of water and the vast expanses of algal nodules between 33.5 and 54.9 m of water. The deepest recorded occurrence is 9 m. The observations during this dive more then triple its known depth range.

475. Sieg, J., and R. W. Heard. 1988. "Tanaidacea Crustacea Peracarida of the Gulf of Mexico. V, The family Pseudotanaidae from less than 200 meters with the description of *Pseudotanais mexikolpos* new species and a key to the known genera and species of the world." Proceedings of the Biological Society of Washington 101 (1): 39-59
No published records exist for pseudotanaid tarnaidaceans in the Gulf of Mexico. In this study three species, *Iungentitanais primitivus* (Sieg, 1973), *Pseudotanais mortenseni* Sieg, 1973, and *P. mexikolpos*, n. sp. are reported from the Gulf or immediately adjacent waters of the Florida Keys [USA]. *Iungentitanais primitivus* and *P. mortenseni* were previously known only from their type localities, both at San Thomas Harbor in the West Indies. *Pseudotanais mexikolpos* is described from a single location in the West Flower Garden Banks off Texas. It most closely resembles two Mediterranean species, *P. mediterraneus* G. O. Sars, 1882, and *P. unicus* Sieg, 1977. It can be separated from *P. mediterraneus* by having a much longer disto-sternal seta on the propodus of peraeopods 4-6 and from *P. unicus* by its shorter cephalothorax and distinctly larger peraeopod 3. A key to the five known genera and 25 described species of the family is included and taxonomic problems concerning several species are briefly discussed.

476. Siemers, C. T. 1971. "Effect of Late Pleistocene karst topography on Holocene sedimentation and biota, lower Florida Keys." Geological Society of America. Bulletin 82 (1): 211-217

477. Siemon, C. L. 1988. "Plan implementation in the Florida Keys through land acquisition." Coastal Management 16 (1): 93-96

478. Simberloff, D. 1976. "Trophic structure determination and equilibrium in an arthropod community." Ecology 57 (2):395-398

479. Simpson, J. 1986. "Observations and mechanisms of GATE waterspouts." Journal of the Atmospheric Sciences 43(8): 753-782
The GATE data base for days 261 and 186 is used for a combined observational and numerical investigation of interacting cumulus processes that may be important in the generation of waterspouts. The results suggest that the

existence of cumulus-scale parent vortices is a necessary condition for the production of waterspouts, but not in itself sufficient. For generation of a visible funnel, the vortices must undergo intensification below cloud base to sea level during the short time span in which the convective updraft is active. A high-resolution version of Schlesinger's three-dimensional cumulus model with a Kessler-type precipitation scheme is used to analyze the organization of cumulus-scale vorticity on these two days, which had contrasting thermal stratification and cloud features. On day 261, the soundings near but outside the cloud cluster had a relatively deeper cloud layer with weaker conditional instability and vertical wind shear at low levels. In the numerical simulation of the congestus, downdraft underruns updraft early, so that the strong vortex pair at midcloud levels does not extend to the surface, where the vorticity remains weak, even though a wide range of wind profiles was tested in the model. On day 186, the soundings near the waterspouts showed a more unstable subcloud and lower cloud layer capped by a stable dry layer restricting cumulus growth below 4 km. Four wind profiles were used in this case to initiate the numerical model; two with strong low-level shear resulted in strong parent vortices, with their maximum intensity at the surface. These vortices strengthened in the convergence between side-by-side updraft and downdraft, which both extended to the surface, a rare configuration for GATE but characteristic of many midwestern tornadic developments. The observations from both days suggest that the waterspouts formed ahead of the wind shift, resulting from passage of a gust front in zones where it may be surmised that two gust fronts were approaching one another. A summary is given of results on tropical gust fronts to provide a basis for discussing their role in the generation of tropical waterspouts; and it is shown that 1) they can produce a favorable environment for the parent vortices, and 2) they can cause additional vortex intensification. Order-of-magnitude vorticity calculations suggest that small-scale, low-level convergence may have been sufficient, particularly on day 186 when the waterspout signatures were observed at intersecting convergent features, to intensify the parent vortex in as little as 5-10 min. On day 261, additional model experiments simulating pregust front conditions (low-level destabilization and increased shear) show stronger parent vortices at low levels. Reasons for the rarity of GATE waterspouts are suggested, and a renewed observational program is proposed for the Florida Keys, which relates waterspouts to cloud interactions and boundary layer features.

480. Sims, H. W., Jr. 1967. Plankton collections with pertinent data, Florida Keys, Monroe County, USA, August 1962, January 1964, lobster, crab, fish, copepods. St. Petersburg, Fla.:

Florida Division of Salt Water Fisheries. Special Scientific Report (Florida Marine Laboratory), no. 15.

481. Smetana, A. 1984. "Revision of the subfamily Sphaeridiinae of America north of Mexico Coleoptera Hydrophilidae 2." Canadian Entomologist 116 (4): 555-566
Pelosoma pecki sp. nov. is described from specimens from the Florida Keys (Upper Matacumbe Key [USA]) and from Mexico (Oaxaca). Genyon Smetana 1978 (type-species *Cercyon navicularis* Zimmerman 1869, from eastern North America) is placed in synonymy with *Tectosternum* Balfour-Browne 1958 (type-species *T. exstriatum* Balfour-Browne 1958, from equatorial Africa). A lectotype is designed for *Pelosoma prosternale* Sharp 1882 and *P. pracecursor* Smetana 1978 is placed in synonymy with *P. prosternale* Sharp 1882. *Omicrus intermedius* Smetana and the genus Cycrillum Knisch, with the species *C. strigicolle* (Sharp), are recorded for the 1st time from North America. Data on bionomics, geographical distribution and synonymy of many species are presented.

482. Smith, C. L., and J. C. Tyler. 1977. "Re description of the gobiid fish *Coryphopterus lipernes* with notes on its habits and relationships." American Museum Novitates 2616:1-10
The bluenose goby, *C. lipernes*, was described in 1962 from 3 specimens collected in the Florida Keys [USA]; it has remained poorly known since that time. Recent collections and observations indicate that this species is widespread in the Caribbean and Bahamas but at low population densities wherever it occurs. It is one of the few species of western Atlantic reef fish that lives in relatively continuous close physical contact with live corals. All the individuals observed at night and during the day spent most of the time resting on live corals, with only a few brief forays onto nearby algal mats, or off the coral to feed. The bluenose goby is an ecological counterpart of the Indo-Pacific clownfish (Amphiprion). The mechanism by which the bluenose goby avoids being stung by coelenterate nematocysts may not be the same as that of the clownfish because clownfish become acclimated to individual anemones, whereas the bluenose goby can move freely back and forth among coral colonies of both the same and different species. Other species of fish associated with live corals in the West Indies share with the bluenose goby certain features interpreted to be specializations for this way of life. Within the genus Coryphopterus, 2 divergent lineages show progressive specialization toward coral-dwelling on one hand, and sand-dwelling on the other.

483. Spitzer, N. C., and J. D. Lazell, Jr. 1978. "A new rice rat *Oryzomys argentatus* new species from Florida's lower keys, USA." Journal of Mammalogy 59 (4): 787-792
Oryzomys (Oryzomys) argentatus, sp. nov. is described from

the lower Florida Keys [USA]. It is distinguished from all other members of the subgenus by long, slender nasal bones, a narrow skull, and silvery gray pelage. The habitat is cattail (Typha sp.) marsh interspersed with mangrove; the marsh water is fresh. The new form is rare and endangered because of fresh-water marsh destruction.

484. Stange, L. A., and R. J. Knight, Jr. Fig pollinating wasps of Florida (Hymenoptera: Agaonidae). Beltsville, Md.: U.S. Department of Agriculture, Agricultural Research Service. Reprints.

485. Steinker, D. C. 1982. "Late Pleistocene Foraminifera, Florida Keys, USA." Florida Scientist 45 (4): 234-244
Fossil foraminifera were identified from the late Pleistocene Miami Limestone and Key Largo Limestone of the Florida Keys. The dominant foraminifera from the oolite unit of the Miami Limestone are the same species that occur most commonly in the recent oolite deposits of the Great Bahama Bank. The assemblage from the bryozoan unit of the Miami Limestone is typical of the shallow shelf sea behind the Cat Cay oolite mounds today on the western edge of the Bahama Banks. The foraminifera of the upper part of the Key Largo Limestone suggest a shallow-water, coral reef deposit in the absence of a protective outer reef.

486. Stevely, J., and D. Sweat. 1985. Survival and growth of cut vs. hooked commercial sponges in the Florida Keys. Gainesville, Fla.: Florida Sea Grant Extension Program. Florida Sea Grant Technical Paper, no. 38.
The present study was conducted to establish whether a change in harvesting technique, cutting rather than tearing the sponge loose, could insure sponge regeneration can thus reduce the possibility of over fishing. The maximum estimate of sponge survival for cut sponges is 71% and for hooked sponges is 41% the minimum estimate is 51% and 26% respectively.

487. Stevenson, H. M., E. Eisenmann, C. Winegarner, and A. Karlin. 1983. "Notes on common nighthawks *Chordeiles minor* and Antillean nighthawks *Chordeiles gundlachii* of the Florida Keys, USA." Auk 100 (4): 983-988

488. Stewart, M. 1988. "Electromagnetic mapping of fresh-water lenses on small oceanic islands." Ground Water 26 (2): 187-191
The electromagnetic profiling method was used to study small fresh-water lenses in two small Florida keys, Flagler Beach, and Big Pine. It was assumed that the water table was close to sea level, that the unsaturated and fresh-water saturated geologic units had low bulk conductivities, and that the interface depth could be obtained from a three-layer solution.

The first layer, the unsaturated zone, was assumed to be as thick as the land surface elevation above sea level. The third layer, the salt-water saturated zone, was assumed to be infinitely thick. The layer conductivities were either estimated or obtained from resistivity soundings. Since, in resistive environments only the third-layer conductivity has a significant effect on the calculated interface depth, the remaining unknown is the second-layer thickness (the fresh-water saturated zone). The second-layer thickness was sensitive to the value used for the third-layer conductivity. This method supplied a relative lens thickness. For actual thicknesses, the data obtained from the electromagnetic method must be calibrated with other geophysical or water quality data. The method is best suited to reconnaisance surveys or as a supplement to other surveys. Incorrect values are obtained when the interface depth exceeds the effective exploration depth for the coil spacing used (30 m).

489. Stirts, H. M., and K. B. Clark. 1980. "Effects of temperature on products of symbiotic chloroplasts in Elysia tuca Marcus (Opisthobranchia: Ascoglossa)." Journal of Experimental Marine Biology and Ecology 43 (1): 39-47
The effect of temperature on C fixation of symbiotic chloroplasts in the tropical ascoglossan slug *E. tuca* was analyzed and compared with that of the alga *Halimeda discoidea* which serves as food and plastid source for *E. tuca*. Samples of both species were collected from Key Largo, Florida. Maximum autotrophic C fixation for *E. tuca* occurred at 15°C, and for *H. discoidea*, at 20°C. The net fixation rate was higher for *E. tuca* than for *H. discoidea*, suggesting that CO_2 transport by the animal host is an important factor stimulating photosynthetic rate. Temperature also controlled relative production of alcohol-soluble and insoluble components. This effect may control the fate of autotrophically-fixed carbon compounds, possibly determining whether these are used for maintenance metabolism or somatic growth and explaining the greater abundance of plastid symbioses in the tropics.

490. Stoddart, D. R., and F. R. Fosberg. 1981. "Topographic and floristic change, Dry Tortugas, Florida, USA, 1904-1977." Atoll Research Bulletin 253:1-56
Topographic and floristic surveys of the Dry Tortugas keys in 1904, 1915 and 1937 are used in discussions of the changing relationships between area and floristic diversity on small islands over time, and of the processes of colonization and extinction. It is shown that earlier topographic surveys are in general too unreliable to be so used. A list of Dry Tortugas plants, including all published records as well as new collections made in 1962 and 1977, is presented, together with maps of the keys made in 1977. The total flora of ~130 spp. includes at least 35 native species,

including 5 spp. of sea-grasses and 4 spp. of mangroves. Introduced species are largely confined to the 2 largest islands and the floras of the smaller keys are dominated by a small number of native species.

491. Stone, R. B., H. L. Pratt, R. O. Parker, Jr., and G. E. Davis. 1979. "A comparison of fish populations on an artificial and natural reef in the Florida Keys." Marine Fisheries Review 41 (9): 1-11
An artificial reef constructed from scrap automobile tires was placed adjacent to a natural coral patch reef of similar size to study the feasibility of increasing fish carrying capacity and total biomass within a given area by augmenting natural reef habitat. After the artificial reef had been in place 7 mo, visual observations indicated about equal numbers of fish and similar species composition on both the artificial reef and the natural patch reef. Totals of 98 and 85 species were observed on the artificial and natural reefs, respectively. Although the artificial reef was <25 m from the natural reef, it did not diminish the resident populations of the natural reef but doubled the carrying capacity and fish biomass in the immediate vicinity of the 2 reefs. For the remaining 2 yr of the study, the fish populations on both reefs showed similar seasonal fluctuations.

492. Strasser, A. 1984. "Black pebble occurrence and genesis in Holocene carbonate sediments, Florida Keys, USA, Bahamas, and Tunisia." Journal of Sedimentary Petrology 54 (4): 1097-1109
Black carbonate lithoclasts, along with blackened peloids, ooids, skeletal fragments and entire limestone beds are found in the shallow subtidal, intertidal and supratidal zones of modern and ancient carbonate environments. They are often associated with pedogenic features such as root-traces or caliche. The blackening is due to impregnation of the sediment by dissolved, colloidal or finely particulate organic substances in an anoxic and alkaline environment or microenvironment. The organic matter is derived from decayed algae and/or decayed or burnt higher terrestrial plants. Iron sulfides contribute to the blackening, especially in samples containing algal matter. A complex interplay of adsorption of organic matter on carbonate-crystal surfaces, neomorphism and microcrystalline cementation in the vadose or freshwater phreatic zones is thought to fix the organic matter and make the black coloration relatively resistant to oxidation. Black pebbles form throughout reworking of the preferentially cemented and blackened sediment by coastal erosion. They are mostly relics because the less-consolidated host sediment is washed away. Black pebbles may thus be valuable indicators of ancient coastal and terrestrial environments.

493. Sweat, D. E. 1968. Growth and tagging studies on *Panulirus argus* (Latreille) in the Florida Keys. St. Petersburg, Fla.: Marine Research Laboratory. Technical series (Florida Board of Conservation), 57

494. Sykes, P. W., Jr., H. P. Langridge, W. D. Matthews, Sr., and W. D. Matthews, Jr. 1979. "Sight record of gray-breasted martin *Progne chalybea* : new records on the lower Florida Keys, USA." Florida Field Naturalist 7 (1): 10

495. Tachibana, K., P. J. Scheuer, Y. Tsukitani, H. Kikuchi, E. D. Van, J. Clardy, Y. Gopichand, and F. J. Schmitz. 1981. "Okadaic acid, a cytotoxic polyether from 2 marine sponges of the genus Halichondria." Journal of the American Chemical Society 103 (9): 2469-2471

496. Thomas, B. 1984. "Christmas deer : the tiny deer of the Florida Keys." Oceans 17 (6): 46-51

497. Thomas, J. D. 1979. "Occurrence of the amphipod *Leucothoides pottsi* Shoemaker in the tunicate *Ecteinascidia turbinata* Herdman from Big Pine Key, Florida, U.S.A." Crustaceana 37 (1): 107-109

498. Thomas, J. D. 1979. "Re description of the wood rasping amphipod *Tropichelura gomezi* Cheluridae from the Florida Keys, USA, with notes on its distribution and ecology." Proceedings of the Biological Society of Washington 92 (4): 863-872
The wood-rasping amphipod, *T. gomezi* Ortiz, 1976, is redescribed from the Florida Keys to include diagnostic characters omitted in the original description. Morphological characters and distributional patterns of *T. gomezi* are compared with those of the other member of the genus, *T. insulae* (Calman, 1910). Laboratory studies show that *T. gomezi* defends its burrow entrance from other members of its species, but tolerates the presence of limmoriid isopods with which it co-occurs. A lectotype for *T. insulae* is designated.

499. Thomas, J. D., and J. L. Barnard. 1984. "*Acanthohaustorius pansus* new species of sand-burrowing amphipod from Looe Key Reef, Florida Keys, USA, with redescription and distribution data of *Acanthohaustorius bousfield* Amphipoda Haustoriidae." Proceedings of the Biological Society of Washington 97 (4): 909-926
A new species of sand-burrowing amphipod, *A. pansus*, is described from carbonate sands of the Florida Keys Reef Tract. This is the 1st time the predominantly cold-water genus Acanthohaustorius has been reported south of Virginia coastal waters. *A. bousfieldi* Frame, 1980, originally

described from Long Island Sound, is refigured and reported from shell-hash sediments off the central Atlantic coast of Florida. A revised key to the species of Acanthohaustorius is presented.

500. Thomas, J. D., and J. L. Barnard. 1985. "*Perioculodes cerasinus* new species, the 1st record of the genus Perioculodes new record from the Caribbean Sea Amphipoda Oedicerotidae." Proceedings of the Biological Society of Washington 98 (1): 98-106
P. cerasinus, a probable cryptic fossorial amphipod with embedded white orbiucular ammatidia in birth ruby eyes is described from Tobago, Belize, Florida Keys, and Biscayne Bay, Florida, USA. The eyes are separated either into 2 lunes or combined side to side into 1 large irregular brow. This is the 1st western Atlantic record a generic group heretofore confined to the warm eastern Atlantic and Indian Oceans. Close affinity appears to be with the type-species of the genus, *P. longimanus,* from the eastern Atlantic Ocean.

501. Thomas, J. D., and J. L. Barnard. 1985. "Two new species of two new gammaridan genera (Crustacea: Amphipoda) from the Florida Keys." Proceedings of the Biological Society of Washington 98 (1): 191-203
Two new species of the new genera *Anamaera (A. hixoni*) and *Spathiopus (S. looensis*), both belonging to the section Gammarida of Amphipoda, are described from the Florida Keys. *Anamaera* is a new genus close to *Maera, Ceradocus,* and *Ceradomaera*, but has a unique combination of minor character expressions. Males of *Spathiopus* have an unusual paddle-shaped antenna 2 but otherwise Spathiopus appears to be an apomorph of Elasmopus.

502. Thomas, J. D. and J. L. Barnard. 1986. "Two species of *Hornellia* (subgenus *Metaceradocus)* from the Florida Keys and Belize (Amphipoda: Melphidippoidea)." Bulletin of Marine Science 38 (3): 477-487
Hornellia (Metaceradocus) atlanticus, a new species from Belize, related to *M. occidentalis,* an eastern Pacific species, is reported from the Caribbean Sea and a morphologically remote new species, *M. tequestae,* is described from the Florida Keys.

503. Thomas, J. D., and J. L. Barnard. 1988. *"Elasmopus balkomanus* new species from the Florida Keys, USA, Crustacea Amphipoda." Proceedings of the Biological Society of Washington 101 (4): 838-842
Elasmopus balkomanus is described from Looe Key Reef in the Florida Keys. The species is very close to the eastern Pacific *E. antennatus* but in the male has equally extending rami on uropod 3, only 2 (versus 4-6) spines on each lobe of

the telson in adults, a lateral ridge on the propodus of male gnathopod 2 and very heavily armed flagella of antenna 2 in the male. This species lives in a short-tufted algal turf community on coral rubble but apparently is rare because it has only been collected once in 10 years of sampling in the Florida Keys.

504. Thompson, T. E., D. G. Lindquist, I. E. Clavijo, S. K. Bolden, S. W. Burk, and N. C. Drayton. 1990. "Assessment of reef fishes at Sombrero Key, Florida." In: Diving for science : proceedings of the American Academy of Underwater Sciences Tenth Annual Scientific Diving Symposium, October 4-7, 1990, University of South Florida, St. Petersburg, Florida. Costa Mesa, Calif. : American Academy of Underwater Sciences.

505. Thorhaug, A. 1970. "Temperature limits of some tropical marine algae." Journal of Phycology 6 (Suppl.): 12-13.

506. Thorhaug, A. 1982. "Seagrass restoration in the Florida Keys." 33rd Annual American Institute of Biological Sciences Meeting, University Park, PA, 8-12 Aug 82.

507. Thorhaug, A. 1983. "Habitat restoration after pipeline construction in a tropical estuary seagrasses." Marine Pollution Bulletin 14 (11): 422-425
In 1981 the Florida Keys Aquaduct authority permitted the construction of a new water transmission pipeline through the Florida Keys, USA. The seagrasses Halodule wrightii and Thalassia testudinum in an estuary and wetland area north of Key Largo would be removed by a portion of the pipeline construction. Consequently, government construction permit conditions required restoration of these seagrasses. After construction, Halodule shoots were planted over the pipeline trench in an area 6.1 x 975 m on 0.9 m centers. Additional transplantation of Halodule and Thalassia was deemed necessary, especially in areas lateral to the pipeline trench, and was done later in 1981 by a 2nd party. Results after 10 mo. showed that 31.1±0.9% (X±SE) of the area in the pipeline trench was covered by Halodule shoots; 1261 Thalassia seedlings were observed in the entire affected pipeline area. This is the 1st report of pipeline damage restored with seagrasses.

508. Topp, R. W., and F. H. Hoff, Jr. 1972. "Flatfishes Pleuronectiformes." Memoirs of the Hourglass Cruises 4 (2): 1-135

509. Tourtellotte, G., and H. Kritzler. 1988. "*Scionella papillosa*, a new species of polychaete (Polychaeta: Terebellidae) from the southwest Florida continental shelf." Proceedings of the Biological Society of Washington 101 (1): 79-82
Scionella papillosa, a new species of terebellid polychaete

from the southwest Florida continental shelf is described. It more closely resembles the only other Atlantic species, *S. lornensis* Pearson, 1969, than the Pacific species, *S. japonica* Moore, 1903, *S. estevanica* Berkeley & Berkeley, 1942, and *S. vinogradovi* (Ushakov), 1955, in lacking a ridge on segment 4, but it differs from all four in having densely packed small digitiform papillae on the ventrolateral surfaces of the second segment.

510. Trager, J. C. 1988. "A revision of Conomyrma Hymenoptera Formicidae from the southeastern USA, especially Florida with keys to the species." Florida Entomologist 71 (1): 11-29
Workers of five new species of Conomyrma for Florida and other southeastern states are described, and 2 existing taxa are redescribed. Queens are described for most species. Males are not readily distinguishable, as far as known.

511. Trantham, W. 1975. "Madreporarian corals of the Florida Keys." Florida Scientist 38 (Suppl. 1): 7

512. Tucker, J. W., Jr. 1984. "Hormone-induced ovulation of black sea bass and rearing of larvae." Progressive Fish-Culturist 46 (3): 201-204
Black sea bass (*Centropristis striata striata*) support important commercial and sport fisheries along the U.S. Atlantic coast. Adults are distributed over the continental shelf and in bays from Cape Cod, Massachusetts, to Cape Canaveral, Florida, and occasionally to the Florida Keys. This note describes a technique that met with consistent success for inducing ovulation in black sea bass females, and presents results from larval rearing experiments of 12-56 days duration.

513. Turner, B. L., and K. J. Kim. 1990. "An overview of the genus *Pyrrhopappus* (Asteraceae: Lactuceae) with emphasis on chloroplast DNA restriction site data." American Journal of Botany 77 (7): 845-850

514. Tuskes, P. M. 1980. "The life history of *Aellopos tantalus* Sphingidae." Journal of the Lepidopterists' Society 34 (4): 327-329
The life history and immature stages of *A. tantalus* are described for the 1st time. The larval host plant is 7 yr apple, *Casasia clusiifolia*, a member of the coffee family, Rubiaceae. Larvae exhibit a green or a brown color phase in the 4th or 5th instar. Pupation occurs in the leaf litter with adults emerging in the morning. In the Florida Keys, [USA] A. tantalus has a minimum of 6 generations/yr. Adults were usually observed shortly before and after sunrise, and again prior to dusk.

515. United States. Minerals Management Service. Gulf of Mexico

OCS Region. 1987. Southwest Florida Shelf Ecosystems Study, Volume 1: Executive Summary. New Orleans, La.: The Service. The 6-year Southwest Florida Shelf Ecosystems Program began in 1980 as an interdisciplinary study. The study area extends seaward from the west coast of Florida to the 200-meter isobath and from 27 deg N latitude southward to the Florida Keys and Dry Tortugas. The region includes Florida Bay but not other estuarine areas. This area contains numerous live-bottom habitats and associated communities in a complex, patchy matrix. Live-bottom areas are often separated by wide expanses of sand or mud bottom areas. The report concludes the 6-year Southwest Florida Shelf Ecosystems Program's environmental study. The ultimate objective of the program was to determine the potential impact of OCS oil and gas offshore activities on live-bottom habitats and communities, which are integral components of the southwest Florida shelf ecosystems.

516. United States. Office of Coastal Zone Management. Operations manual, Key Largo Coral Reef Marine Sanctuary Deep Water Resource Survey, March 26-30, 1979, and May 31-June 7, 1979. Washington, D.C. : U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management.

517. "United States v. State of Florida (Determining Federal Versus State's Rights in Lands, Minerals and Resources Underlying the Atlantic Ocean and Gulf of Mexico)." 1976. 96 S Ct 1840-41.
Plaintiff federal government sought declaration of rights as against defendant state government to natural resources in ocean submerged lands. After reports by a master and a special master, the United States Supreme Court decreed that the State of Florida is entitled to all lands, minerals and other resources within an area three geographic miles from the Atlantic coastline and within three marine leagues from the Gulf of Mexico coastline. The United States was found to be entitled to all resources underlying the Atlantic beyond the Florida limit to the continental shelf edge and to all resources beyond the Florida limit in the Gulf of Mexico. For purposes of the decree Florida Bay and areas of water within the Dry Tortugas Islands, the Marquesas Keys, and the Lower Florida Keys are not inland waters.

518. "United States v. Florida (Proceeding seeking definition of seaward boundary of submerged lands of continental shelf)." 1975. 95 S. CT. 1162-1164
Plaintiff federal government sought a decree defining the seaward boundaries of submerged lands of the continental shelf in the Atlantic Ocean and Gulf of Mexico in which Florida has the right to natural resources. The issue was referred to a

special master who recommended recognizing a portion of Florida Bay as a 'juridicial' bay and drawing 'closing lines' around three groups of islands which comprised the Florida Keys. The United States took exceptions to these findings which were made without the benefit of arguments raised by both parties on appeal. The Supreme Court referred these exceptions to the special master for consideration.

519. "United States v. Joseph G. Moretti, Inc. (Court Approved Compromise for Restoration of Area Damaged by Development)." 1976. 423 F Supp 1197-1204
The United States brought suit against defendant developer under the Rivers and Harbors Act to enjoin him from conducting dredge and fill work in Florida Bay in the Keys. After the appellate court remand of the case for an evidentary hearing on a plan to restore the topography of a small island, the United States District Court approved the government plan. The defendant had dredged upland canals, damaging fish and bird habitats and disrupting the recreational areas nearby. The plan was designed to insure that minimum federal and state water quality standards would be met without placing any more burdens on the defendant than was absolutely necessary. Restoration was confined to those areas found by the court to be within the jurisdiction of the government. The court further found that the restoration plan would not interfere with the recreation of lot owners in the developed area or with access to Florida Bay.

520. Vann, A. C. Nix. 1980. The ecology of the caridean dominated shrimp community in seagrass beds off Cedar Key, Florida. Ph.D. diss., University of Florida.

521. Vorsey, L. D., Jr. 1982. "Where does the Gulf of Mexico end and the Atlantic Ocean begin?" Sea Front 28 (4):231-239
During the summer of 1980, NOAA administrators considered the arguments presented by the contending councils, and a compromise that consisted of a seaward extension of the original Dade-Monroe line to the southeast. In the end, they decided that the legal precedent of the Supreme Court decision in the earlier United States vs. Florida case formed "a persuasive statement of contemporaneous legislative intent." The United States vs. Florida line, which runs from the coast of Cuba north along the 83rd meridian to the Dry Tortugas and through the Florida Keys to the mainland of Florida, unless successfully challenged in some unforseen future litigation, stands as the jurisdictional boundary between the Gulf of Mexico and South Atlantic fishery management councils.

522. Walford, L. A., and R. I. Wicklund. 1968. Monthly sea temperature structure from the Florida Keys to Cape Cod.

INDEX

The index comprises two sections. The author index contains references to authors and editors of works. The subject index contains references to place names, scientific names, common names, and topical terms. Scientific names at the species level are listed alphabetically under the corresponding genus name.

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